University of Cincinnati

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I, Andres MG De Wet, hereby submit this original work as part of the requirements for the degree of Master of Community Planning in Community Planning.

It is entitled: 
Toronto: Linking the Lake - Solutions for an Urban Infrastructural Disconnect

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This work and its defense approved by:

Committee chair: Conrad Kickert, Ph.D.

Committee member: Leah Hollstein, Ph.D.
Solutions for an Urban Infrastructural Disconnect

A thesis submitted to the Graduate School of the University of Cincinnati in partial fulfilment of the requirements for the degree of

Master of Community Planning

in the School of Planning of the College of Design Art Architecture & Planning

by Andres M. G. de Wet

B.S. University of Cincinnati

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Committee Chair: Dr. Conrad Kickert
Committee Vice-Chair: Dr. Leah Hollstein
SOLUTIONS FOR AN URBAN INFRASTRUCTURAL DISCONNECT

Abstract

Limited-access road and rail infrastructure in inner-cities connects the whole at the expense of the affected parts. The 1950’s and 60’s ushered in an era of urban renewal and freeway building that saw cities connected to far-flung suburbs, compromising their neighborhoods, residents and urban livability. Railway construction predated this and, as public-transit, has not attracted the planners’ ire to the same intensity as have freeways; however, it remains a grey ribbon of localized disconnect in inner-cities. Only recently has rail been seen as retrofitable to the local urban need. Toronto has triple wicked urban problems: wide swathes of rail, an elevated urban freeway, and unsightly and choked at-grade arterials. All this, in the heart of a burgeoning city. A city that allows for design dreams, in an environment of perpetual fiscal prudence. A city whose primary urban activity zones straddle this arterial road and rail drosscape. A city seeking spatial unity and a reconnection to its gleaming and burgeoning lakefront.
by Andres de Wet for the

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College of  D | A | A | P : SCHOOL OF PLANNING
I have always had a soft spot for Canada. The reason being that I am a planner with transnational origins: born in the Midwest of the United States, but having lived the bulk of my life on the southernmost tip of Africa at Cape Town, South Africa. It follows that Canada has represented a ‘best of both worlds’ to some degree for me. A comfortable bastion of the commonwealth with a North American essence.

I have an intense interest in thriving cities and their urban problems. Particularly multicultural centers balancing economic growth with inclusionary pressures. Urban connectivity conundrums, caused by transportation and infrastructural issues, turned my interest to Toronto.

While much of the U.S. side of the Midwest struggles with relative stagnation, the Golden Horseshoe (Toronto Metro Area) continues to attract throngs of urban migrants to it. Toronto expands like a North American coastal urban entity, despite being located well away from coasts on an inland sea. My cultural affinity towards the great land to the north, coupled with its urban vibrancy and diversity hamstrung with road and rail disconnects, drew me towards it.
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**Figure 0.A: Toronto's skyline from the north-west (Andres de Wet)**
1 | Introduction

1.1 | Global Urban Issue | Grey Ribbons Of Disconnect

Major cities have predominantly been settled along rivers, lakeshores and oceans, with their reasons for rapid development often being the trade this favorable location has enabled. In modern times, cities have been disconnected from their *historical reasons for being* all across the globe. This issue is particularly chronic in newer cities, where automobile-oriented development occurred unfettered.

During Industrialization and subsequent automobile-centric phases of growth, most downtowns (C.B.D.s) were left orphaned from their waterside locales by industrial, trade, and transport land-use functions. Some cities saw their developmental focus change to railway junctions further inland; however, many more remained connected to waterborne commerce and trade. The post-industrial era of changing spatial priorities, diversifying needs of transport, the deindustrialization of most economies, and recently, the re-urbanization of Western cities, have left many port-oriented areas under-utilized. Many of these functions are now defunct, often halting or complicating urban revitalization efforts. Rapidly urbanizing centers can ill afford land underutilization so close to their urban cores.

However, this issue is often further compounded. Some cities have infrastructure that is simply too entrenched, either systematically or socio-politically, to ponder removal. Others may have severe budgetary constraints, whether these are real (actual lack of overall government fiscal capacity) or logistical (inability to unlock funding from various levels of government), making cost-efficient solutions paramount.
Globally, many cities are hamstrung by the location of transport infrastructure, making their urban fabric discontinuous and non-cohesive. What is meant by ameliorating this? This is making sure where people are coming from and where they are going to is not separated by *drossscape*, urban voids and/or inhumanly scaled built-environments. However, this urban structure is often the status quo, with numerous cities spending billions fixing this, whether for the purpose of city-marketing or for genuine urban livability.

Some regions, like Europe and Australia, primarily struggle with rail-induced disconnects; others, like the United States, struggle with freeway-induced disconnects. Eastern seaboard U.S. cities and Canadian cities struggle with differing magnitudes of both types of disconnection.

Examples of more expensive attempts to ameliorate urban freeways have been met with varied levels of success. The Boston Big Dig cost $15bn, and successes in alleviating traffic, promotion of public- and non-motorized-transit, public-space creation, and unlocking real-estate opportunities are still not definitive (Flint 2015). This is indeed at the capital extreme end of the design-solution spectrum, alongside Seattle with its $3.32bn Alaskan Way tunnel project (Associated Press 2016). Cities like Cape Town are seeking extremely cost-conscious solutions for their Foreshore Freeways; a developing world city with a global status, it lacks the fiscal prowess to implement expensive solutions (Transport for Cape Town 2016).

Other cities are attempting to deal with their urban rail disconnects. Melbourne, at the mid-range of project expense, also grappled with its own delays and cost-overruns. The Federation Square project came in at a lower cost to the state of Victoria and the city, at a rail-capping price tag of $320.15m (2003 eq.) (Hannan 2003). Controversial during completion, it became a huge public-space boon for the city thereafter. A widely-known Midwestern example is Chicago’s Millennium

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Park, regarded as an asset to the city as a well-designed public-space capping unsightly railway infrastructure. The park cost a total of $475m, of which $270m came from the city and the balance from donors (Cohen & Ford 2004).

The reason cities are seeking to reconnect to their waterfronts and their historic roots is threefold. Firstly, it simply makes good economic sense (V&A Waterfront 2015). As cities mature beyond the suburban-versus-inner-city phase, people are seeking to live within them, not around them. Handing over prime land to infrastructure to ferry dormitory suburbanites to work is not financially viable, nor is it a sustainable use of valuable land.

Secondly, the macroeconomics of nations have changed. Deindustrialization has run its course and many global cities are now service-sector and financial centers (Boundless 2016). Again, land for industrial and transport purposes on wharves or sprawling rail yards is underutilized and is much more valuable when repurposed for a use that would better suit the modern city economy.

Thirdly, urban civilization has matured. We are no longer within the manufacturing city or (Congrès International d'Architecture Moderne) CIAM-inspired urban paradigm. The industrial landscape, or placeless, international-style cityscape, finds fewer allies. This morphological structure no longer finds favor with most urban residents or the political establishment. More people are yearning for walkable, human-scaled spaces that cater to their daily needs, with a more traditional approach to urbanity. This need drives the inner-city property market and determines what is best for the city’s coffers (Ryan 2003).

Thus we ask the global question:

How can waterfront cities be reconnected to their waterfronts in a meaningful and fiscally feasible manner?
1.2 | Localizing the Issue

The industrial era of river-based commerce and trade, followed by the era of rail, has disproportionately affected city waterfronts. Although the issue is global, with cities from the Asia-Pacific to Africa and some European cities having to contend with this, nowhere is the waterfront-downtown disconnect as evident as in North American cities. These cities are widely touted as being the flagbearers of sprawl and the poster children of auto-centric urban development (Wendell Cox Consultancy 1-120, 2016).

What is the largest disconnect problem for these cities? We do not need to travel far to find the culprit. Within the Great Lakes megapolitan\(^2\) region of Canada and the U.S.A., numerous cities grapple with this issue. Rail lines and marshalling yards, coupled with urban freeways, cut the urban fabric between downtowns and waterfronts. Chicago has Lake Shore Drive and railway lines; Cincinnati has Fort Washington Way; Cleveland has rail lines and Memorial Shoreway; Buffalo has the Niagara Thruway; and Toronto has the elevated Gardiner Expressway, at-grade Lake Shore Boulevard and CN Rail lines.

2 | Thesis Question

What design solutions can mend an urban fabric, ripped apart by infrastructure, located between downtowns and their associated waterfronts?

2.1 | City Selection

To investigate these disconnects and propose a design solution, a city needed to be carefully selected to host the study and proposed intervention. A number of criteria were used to weigh up potential candidates. Herewith follows the selection criteria used, followed by the reasoning behind Toronto’s selection with it meeting the infrastructural and situational parameters.

- The city needs infrastructural disconnects to exist, preferably being multi-pronged, with road and rail disconnects within the urban core.

  **Toronto**: Gardiner Expressway, Lake Shore Boulevard and CN Rail corridor

- It must be dealing with development pressures, not stagnation or decline. The region should be amenable to planning and possess economic conditions capable of handling a significant urban design proposal.

  **Toronto**: Booming downtown with a burgeoning inner-city residential sector; despite its frugal history, not explicitly averse to planning and urban design

- It should be proximal to Cincinnati, OH and thus, accessible for multiple site and stakeholder visits.

  **Toronto**: An 812 km (504 miles) drive to the north, or a 1hr 15min flight (CVG-YYZ)

- It should be a world city with a culture of approachability, allowing ease of access to public officials, facilitating information gathering and project collaboration.

  **Toronto**: An ‘alpha world city’ (GaWC Cities Index) in a Canadian cultural milieu
The land within the identified ‘disconnect’ should preferably already have development momentum, ensuring designs solve an urban issue within an in-demand urban site.

Toronto: Land within brownfield sites peppered with development applications, with high-rises are going up at a breakneck pace
2.2 | Why Toronto? Linking the Lake

Canada’s financial heart possesses all the criteria needed to study this problem and has a threefold infrastructural divide: the elevated Gardiner Expressway, the at-grade and wide Lake Shore Boulevard, and the broad swathe of CN rail lines. Toronto also possesses a combination of opportunities and constraints that makes investigating a design solution here so valuable to other cities around the world.

Infrastructural progress has left Toronto with this *grey ribbon of disconnect*, three swathes of distal connectivity leaving proximal connectivity and urbanity wanting. It is a global city experiencing phenomenal growth pressures. Valuable real-estate is locked up these aforementioned grey ribbons through its lucrative core. Residents and daily commuters are also the poorer for these spatial idiosyncrasies (Rider 2015).

The *grey ribbons of disconnect* refers to the transport infrastructure that drives a wedge between downtown Toronto to the north of Front Street and the burgeoning waterfront precinct to the south. Infrastructural dross makes crossing the rail barrier unpleasant, including crossing lanes of...
traffic, exposed to elements in bleak, impervious environments and funneled into dark, under-viaduct spaces.

This area is not just a physical barrier in the theoretical and psychological sense, it is a hindrance to the movement of people in the practical sense. Many of Toronto’s sports amenities and leisure attractions lie within this contentious corridor; the Air Canada Centre, Rogers Centre, CN Tower, Ripley’s Aquarium, Roundhouse Park and Toronto Railway Museum and even the Metro Toronto Convention Centre, are all scattered amongst this ‘grey ribbon.’ Had this area been underdeveloped, underutilized, and unimportant for the image of a global city, the impetus might not be there to give it such urgent attention. However, this design intervention is front-and-center in making Toronto look and play the part of Canada’s financial capital, largest city, and its only alpha world city (GaWC: Loughborough University, 2012).

Toronto has a long history of hosting a frugal city government with limited access to funds and methods of revenue generation; thus, the design solution needs to make sound financial sense (Hess 2016; Relph 2014, 48-52). Ontario and the TTC (Toronto Transit Commission) are engaging in more transit spending, giving solution-seeking a potential practical outlet (Ministry of Transportation 2016; Metrolinx 2017; Build ON 2017). Additionally, the city has opted to keep the contentious Gardiner Expressway in place (Tahair & Bowen 2016; Theodore 2016).

Toronto is an Alpha World City with limited capital-project options and possesses a complicated milieu of disconnects combined with proximal rapid growth. All of the aforementioned factors contribute to a complex situation. However, if the resulting design conundrum can be cracked, it can be of value globally.
2.2.1 | Study Scope

Toronto is Canada’s largest city and financial capital, located on the northern shore of Lake Ontario. It is a multicultural metropolis (GTA: Greater Toronto Area) with a population of 6,055,724, accounting for 17% of all Canadian residents (Hopper & Rocha 2015). The City of Toronto itself accounts for approximately 2.79-million (City of Toronto n.d.).

The city is a large conurbation of continuous urban development from Hamilton in the south-west to Oshawa in the east forming a necklace of development around western Lake Ontario, called the “GTA.” When referring to the Greater Golden Horseshoe, the metropolitan area geographically expands to include St. Catherines and Niagara Falls in the south, all the way to Peterborough in the north-east and Barrie and Georgian Bay in the north-west. The amalgamated city is roughly rectilinear in form in the middle of the necklace, stretching from Highway-427 in the west to just south of the 407-ETR at Steeles Avenue in the north and encompassing Scarborough in the east (Relph 2014, 18 & 23). The high-rise downtown is located at the south-center, on the lakeshore. This is where the study site is located, right at the heart of Canada’s most extensive city and financial powerhouse.
For later reference within this study, and for the purposes of the aforementioned explanation, refer to the map of the core of the GTA urban region below. Using road density as a marker for urban development, the map displays areas with contiguous urban development, from Oshawa to Oakville and Milton. The limited-access highways are clearly indicated in red.

**Figure 2.2.A: Greater Toronto Metropolitan Region (Andres de Wet)**

The GTHA, or Greater Toronto and Hamilton Area, includes the aforementioned area, as well as the city of Hamilton to the south-west of the GTA area.
Narrowing in, Toronto has a booming commercial downtown to the north while the residential Lakeshore is growing rapidly to the south. Yonge, Bay, York, and Lower Simcoe Streets are prime north-south axes of activity across most metrics. The core study area is bound by The Bentway at Spadina Avenue in the west and by Parliament Street and the East Gardiner Realignment in the east. Urban activity is intense at all aforementioned points and at key urban amenities, such as Union Station, Rogers Centre, CN Tower, St. Lawrence Market, and the Harbourfront Centre. Yet these locales remain spatially fractured. Amongst this boom, there is a ‘grey ribbon of disconnect’ running through it all. This ‘grey ribbon’ is clearly visible looking east and west from the CN Tower observation deck: the CN rail lines and the Gardiner Expressway and associated Lake Shore Boulevard.
2.2.2 Sub-Questions

- How much of a barrier to ‘pedestrian at-grade movement’ does each element of infrastructure pose? *Why: How are we to priorities each element of this disconnect: The CN Rail lines, as well as the above-grade Gardiner Expressway and at-grade Lake Shore Boulevard.*

- How can established rail infrastructure, cutting straight through an urban fabric, be retrofitted and reimagined through design interventions, such that the urban fabric can be sewn back together? *Why: The pedestrian Teamway at Bay Street is not functioning at optimum with all road-tunnels being uninviting; vital urban amenities lay to the north and south of the rail lines; and can unlocking air-rights above rail lines be a property and/or green space redevelopment asset?*
- The elevated freeway (Gardiner Expressway) is here to stay: what interventions can turn it from a liability into an infrastructural asset of redesigned ingenuity? Why: Less of a hindrance to pedestrian movement than postulated, it remains uninviting; can this space become an asset to the public-realm, just like Bentway and Underpass Park?

- What interventions of at-grade arterials (Lake Shore Boulevard) will facilitate greater ease-of-access between downtown and the lakeshore? Why: Pedestrians experience a major vehicular hurdle at this point; how can a potential ‘complete streets’ intervention facilitate this link?

- How can cross-cutting corridors (Yonge, York, Bay and Jarvis) be improved to facilitate this improved access? Why: This needs to correlate with rail interventions and questions need to be asked if vehicles and pedestrians will be grade-separated or not; also, whether in situ tunnel improvements may suffice?

- Could design solutions help in the provision of urban open space and green infrastructure and if so, what do these entail? Why: Toronto lacks immediate downtown urban open space; does it thus make sense to repurpose areas and infrastructure as green and/or urban open spaces and does it make financial sense?

- What is the most significant takeaway from each case-study? Why: Allocate the strongest design solutions and best-practices in each case-study to the most relevant issue of disconnect.

Upon analyzing the case-studies for their strongest design elements of implementable use, a picture will arise that will help inform the best solutions for Toronto’s lakefront disconnect.
3 | History & Background

We need to investigate the origins of infrastructural development and why this occurred, to understand how our aforementioned issues came to be in Toronto. It also needs to be seen whether this progress aided or inhibited spatial connectivity in cities, both in the case of local and metropolitan connectivity. The history of rail and road development is vital to understand Toronto’s current waterfront spatial and land-use paradigm. Industrialization was vital for the progress of civilization and by proxy, urban progress. However, what has this progress of a prior era left cities with, what remnants remain desirable for today’s urban needs, and what design remedies are available for their adaptive use?

3.1 | The Issue of Rail

Some European cities were spared disconnects caused by inner-city rail lines cutting through the urban fabric. Rail simply came much later than these cities being built-out to a critical density, making acquiring property prohibitively expensive and onerous. This is seen in cities like Paris, where rail lines terminate at their respective stations just inside the Boulevard Périphérique. Similarly, in London, only the subterranean Thameslink crosses the built-up City of London. Other lines terminate at Victoria, Paddington, Kings Cross-St. Pancras, Waterloo stations and the like.

As North American cities are newer, they provided a more porous fabric to penetrate; meaning, being newer meant they are not as built-out, with few historic preservation concerns. This was exacerbated by anti-urban sentiment that persisted in the late-19th and early-20th centuries, viewing cities as a problem. Thus wholesale destruction of large swathes for new development and renewal was not frowned upon. This was a key tenet of modernism that formed U.S. cities and spilt over to Canada (Sewell 1993, 4-5)
Despite the cultural and colonial differences to U.S. cities, Canadian cities did not differ much in their formative anatomy, other than industrialization being a more languid process. This is due, in part, to the difficulty of the northern, forest environment, and the dependency on Montréal and American cities to the south to access markets and form technological and transport linkages (Relph 2014, 34-35). However, Canada embraced rail with fervor in 1849, with the passing of the Guarantee Act; this Act provided federal guarantees on rail bonds for projects over 120 km (75 miles) in length (Fahey 2006).

Canada’s first railway was a harbinger for days to come. The Champlain & St. Lawrence Railroad opened as a seasonal portage for river traffic near Montréal in 1836. Despite being limited in scope, Canadian cities saw their rails tied to their river and lakefronts henceforth. Thunder Bay, Hamilton, Montréal, and Toronto all saw their waterfronts heavily given over to transportation functions. Even ‘model-city’ Vancouver cedes much of the eastern shores of Burrard Inlet to rail.

Whilst this was an economic necessity for trade during the era of industrialization, the shift to the service economy and motor-transit has seen the need for freight rail wane. (Harris 2012, 8). We should continue to develop rail as a passenger alternative, whilst targeting key freight sectors; this will require some improvements to rail efficiency and attractiveness. However, the interaction between cities’ ports, their subsequent deindustrialization, and their freight-rail infrastructure has changed forever. This heavy industry decline is rendering large swathes of rail-to-port infrastructure less important. Thus, cities are reclaiming their water fronts, linking their ‘reasons for being’ to the urban core.

Toronto is attempting to make this link, even though it seems to do be doing so in an urban game of leap-frog-the-dross: an attempt to negate disconnects by rapidly developing around it. This method has short-term fiscal advantages of needing little public investment. This may cause
long-term structural problems and inevitably, depress land value potential. The structural problems arise from how abutting developments are designed and face the urban fabric. Buildings find new ways of turning their backs to rail and road infrastructure. Developments often simply go for height to mitigate bad near-grade visual impacts. This inevitably deadens the street-level urban environment, further depressing land-valuation potential.

### 3.2 | The Issue of Urban Freeways

Urban freeways have become a central issue to many planners in North American downtowns. More recent planners and planning writers, like Jane Jacobs, have derided the decision by many cities to bulldoze these auto-centric structures through urban neighborhoods. The history of the urban freeway is far more recent than that of rail, and thus, impacts on European cities have been minimal. Even Australian urban centers were mostly unscathed, as their freeway boom occurred as late as the 2000’s, precluding surface expropriation of property for freeway right-of-way (UBD-Gregory’s Maps 2000-2011).

Another factor aiding motor-oriented development and construction was the well-oiled machine of the automobile lobby in the United States. The Good Roads Initiative helped usher in the first Federal Highway Act of 1916, gaining momentum after the Federal-Aid Highway Act of 1944 and establishing a 50-50 state-federal funding model for roads in the U.S. It took numerous years to overcome ideological differences in funding models. In 1956, the U.S. government finally contributed to the bulk of road investment with the passage of the Federal Aid Act, pledging $26bn to freeway construction in a 90-10 federally subsidized model (Gutfreund 2004, 37-59). This had an effect on Canada by proxy, even though the domestic policy towards freeway construction was less aggressive and road funding remains the domain of provinces to this day (Tahair & Bowen 2016).
The fault then, and remains so today, was the notion that automobility comes at no direct cost to the user. This false preconception has its roots in lobbyist groups at the start of the automobile age in the early 20th century, such as the NHUC (National Highway Users Conference) and AAA (American Automobile Association). Common sense approaches to the national budget, as seen in the U.K. and Europe, were unheard arguments in North America, being drowned out by the Detroit-interests. (Gutfreund 2004, 29-34, 90). Winston Churchill argued the U.K. position to road funding as thus:

> Entertainments may be taxed; public houses may be taxed; racehorses may be taxed... and the yield devoted to general revenue. But motorists are to be privileged for all time to have the whole yield of the tax on motors devoted to roads? Obviously, this is all nonsense... such contentions are absurd, and constitute an outrage upon the sovereignty of Parliament and on common sense. (Gutfreund 2004, 34)

The passage of the 1956 Federal Highway Act ended the United States acting fiscally on the side of infrastructural common sense and common good; policy closely mirrored in Canada. Henceforth, motorists were subsidized by the general populace and the negative externalities of burgeoning auto-dependency was never passed on to those actively perpetrating it. ‘Automobile’ was interchanged with the essential economic function of ‘connectivity’ and this conflation was exploited for private automotive ends (Gutfreund 2004, 92-95).

With public policy aligning with private interests, and the marketing machine of the ‘ideal city of tomorrow’ turning ever stronger, private citizens and local politicians graciously capitulated to the car. It was accepted that it was a North American government’s responsibility to provide rapid passage and domicile to the auto at no direct cost to the operator. (Gutfreund 2004, 89-92) This became the vicious circle and self-fulfilling prophecy that fueled sprawl and the never-ending hunger for larger and more highways. As private car- and home-ownership was
subsidized and promoted through policy, so cities grew ever larger, less-dense and ravenous for more asphalt (Gutfreund 2004, 88-95).

American and Canadian cities were left scarred. Vancouver famously resisted, being the only city on the continent of one-million-plus residents to have no urban freeway. The Crosstown Freeway to link downtown Vancouver with the Trans-Canada Highway would have ploughed through Strathcona and Gastown. Coming to a head after 1967, the freeway revolt’s success in British Columbia would give credence to those in Ontario resisting the Spadina Expressway’s construction (Stiem, 2016).

In recent times, as property development has exploded on the lakefront, the issue of the Gardiner Expressway viaduct has become a contentious issue. Many Torontonians from inner-city neighborhoods have asked why the urban-freeway is not being dealt with.

Inner-city freeways, as an issue, has created an ideological divide. Those who live further afield see them as a necessity to commute to work and downtown amenities. They view them as integral to the city’s larger auto-transportation system. Those who live in the city-proper view them as barriers to the day-to-day functioning in their neighborhoods. They see freeways as ways to get into and out of cities, but not as a good way to zoom through them (Tahair & Bowen 2016). With the suburbanization of major North American cities, the ideological mass has shifted to the former view - Toronto is no exception.

It was recently decided in the City of Toronto that the Gardiner Expressway would stay (Tahair & Bowen 2016). Coming as a huge disappointment to some, the suburban viewpoint won this round of the ideological argument. The pseudo-logic goes that if a central portion of the through-freeway is removed at downtown, traffic chaos will ensue. The traffic data actually concludes that comparatively little traffic goes through central Toronto; it terminates or
originates in it. Irrespective, the political decision has been made and there will be no Seattle- or Boston-styled solution in the short-term for Torontonians (Tahair & Bowen 2016).
4  | Case-Studies

4.1 | Highway Proposals & Retrofits

This section will investigate the design solutions to bridging disconnects created by urban freeway infrastructure. It takes a look at Cape Town’s Foreshore Freeway proposals and focusses mostly on the inception and design policy phases of a project. The Via Verde example in Mexico City focusses on green design retrofits for existing transport infrastructure. The A8emA, the A8 underpass park in Koog aan de Zaan, showcases how a community uses a freeway underpass redesign to reconnect a community. Toronto’s Underpass Park is a local example in the repurposing of a utilitarian landscape beneath viaducts into a vibrant urban open space.
FACT BOX

<table>
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<tr>
<th>FACT BOX</th>
<th>Cape Town, South Africa</th>
<th>FORESHORE FREEWAY PROPOSALS</th>
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Cape Town is an emerging global city, ranked as a Beta+ World City by the most recent GaWC study, placing South African’s southernmost city in the leagues of cities like Philadelphia and Montréal (GaWC: Loughborough University, 2012). An increased global-urban status, its importance as an African hub for conferences and business, and being awarded the World Design Capital 2014 title, has provided impetus to seek design solutions for a major urban-infrastructural issue.

Its Foreshore Freeways, envisioned in the 1960s and completed in the 1970s, disconnect the CBD from Table Bay and the harbor. The freeways have divided local public opinion, with many claiming they are critical to the functioning of the city’s freeway network. These elevated freeways carry all N1 and N2 (South Africa’s two longest national highways) traffic into the central city. The completed viaducts are proposed to link with the M6 (Helen Suzman Boulevard) across the city’s main gateway, the Buitengracht, providing above-grade access directly to the Atlantic Seaboard neighborhoods from the N1 and N2. However, their alignment could have serious implications...
for connectivity between the rapidly growing CBD and the highly successful port redevelopment project, the Victoria & Alfred (V&A) Waterfront.

**Figure 4.1.1.A: Plan and Design Elements of the Foreshore Freeway (Transport for Cape Town)**

Councilor Brett Herron (Mayoral Committee Member: TCT | Transport for Cape Town) confirmed via email (12/10/2016) that TCT is seeking cost neutral solutions to the Foreshore Freeway issue. The city simply does not have the capital budget to incur the expenditure cities like Boston and Seattle have incurred in dealing with their urban freeways. Thus, Cape Town may rely heavily on public-private partnership solutions. These partnerships have had tremendous success in the city, one such being the Cape Town Partnership, lauded for revitalizing the central business district and arresting the inner-city decline of the 1990’s.

Similar to Toronto’s case, the freeways carry much congestion worry with the motoring populace, most believing their removal would result in traffic chaos to and from the CBD. There is also dissenting opinion, with progressive urbanists and public-transit pundits claiming demolition would have less impact than many foresee and the benefits to internal CBD connectivity would far outweigh the negatives.
Similar to Toronto, Cape Town’s Foreshore Freeways cut through some pivotal urban districts. The Cape Town International Convention Centre (CTICC) is south of it, the entrance to the V&A is within its alignment, the popular De Waterkant and Foreshore districts front it, and the new cruise terminal is to the north of it.

Similar to Toronto, a capital intensive solution is unlikely and politically unpopular. The private sector is likely to receive allowable height, bulk, and development concessions, within some stringent design guidelines, to fund the infrastructural project with property development offsets.

The TCT Foreshore Freeway Prospectus outlines key development and design considerations required for potential design-tender parties. Due to South Africa’s complex socio-political and historical milieu, using Cape Town’s rubric for a ‘good and inclusive design’ would be comprehensive and exhaustive for Toronto’s needs. The TCT Foreshore Freeway prospectus summates these as follows:

- Address all current and future connectivity, within and to-and-from the CBD across all modes.
- Development that is multifaceted, iconic, following transit-oriented development (TOD) principals.
- Mixed-use development that pushes the boundaries of densification and intensification.
- Capture and complement the uniqueness, culture and heritage of Cape Town and its iconic location beneath Table Mountain.
- Address social and economic imbalances, ensuring the development promotes integration, diversity and income-inclusion, including affordable housing requirements integrated into TOD design principles.
- Treatment of the incomplete freeway section: their incorporation into the development, completion or demolition.
- How local content will be addressed, either through design and/or construction.
- Job-creation, both in the short- and long-term. (Transport for Cape Town 2016)

While we currently have no clarity on the way, shape, or form of the proposed design solution for the Foreshore Freeways, we have a clear rubric of goals the City of Cape Town is looking to
achieve and can use these very effectively to measure the design solution outcomes for Toronto (Transport for Cape Town 2016, pg. 34).

**FIGURE 4.1.1.B: FORESHORE FREEWAYS IN THE CONTEXT OF DOWNTOWN CAPE TOWN (ANDRES DE WET)**

**TAKEAWAYS >>>**

- Cities facing larger budgetary constraints compared to Toronto are also seeking solutions to unlocking the potential associated with urban infrastructure redevelopment.
- A private-public partnership solution might be the best way forward; this spreads the burden and potential benefits and also unlocks a faster method of delivering new capital investment projects.
- Socioeconomic considerations should form part of the design, including job-creation prospects during and after build-out, plus affordable housing components (if possible).
- A pure ‘lid park’ solution may not always be the best design solution, both from a perspective of urban user benefit and fiscal benefit to the city.
- TOD-design principles are the way forward. In Toronto, access to weather-resistant public-transit is at a premium.

**DISCUSSION >>>**
Cape Town does not provide much in the way of a design solution that could be studied and interpreted for Toronto’s needs, as this project is still deep in the initial phases of solicited submittals and designs were not forthcoming (as of 12/2016). The Transport for Cape Town document does not articulate any potential design solutions. What they have done is provide a framework in which these design solutions should operate.

This provides us with a potential framework for social and economic inclusive practices. The City of Toronto could demand new developments and design solutions comply with these best practice standards. Cape Town, being a very scenic city with tremendous natural assets, also sets the stage for visually-sensitive development that respects its setting. Toronto may not have a mountain or threatened floral kingdom on its doorstep, but it has a picturesque lakefront. Respecting the city’s relationship to it and enhancing sightlines is something that should be seriously considered.

Not mentioned in the summation of key proposal considerations, but mentioned in the report, are the climatic considerations from rainfall, to wind speed, and sunlight hours (Transport for Cape Town 2016, pg. 31). This too is valuable to lakeshore design solutions, mostly taking Toronto’s notoriously cold winters into consideration, ensuring development doesn’t exacerbate wind-chills, but also providing valuable summer canopy on streetscapes and in green spaces.
4.1.2 | Ciudad de México, Mexico | VIA VERDE

**FACT BOX >>>**

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Mexico City is the largest city in the western hemisphere and grapples with issues of poor air-quality and the provision of adequate urban open-space. The metropole is crisscrossed by numerous elevated freeways and viaduct structures. In an effort to transform what is called a ‘grey city’, the architect and brainchild of the Via Verde project, Fernando Ortiz Monasterio, aims to ‘green’ these vertical spaces. This is achieved by affixing a metal structure and latticework, with a pocketed cloth veneer, to viaduct structural pillars. The cloth pockets are filled with soil and an assortment of suitable plant species.

Automated rainwater irrigation systems fed in part from freeway runoff and supplemented by some grey-water, provides for the plants’ watering needs. Once plants have begun to grow, the structural pillars are transformed into vertical gardens, photosynthesizing carbon dioxide from passing cars into oxygen (UNTV News, 2016).

The project aims to eventually cover a total of 40,000 m² over 700 vertical pillars along 27km of the inner-city Periferico (ENG: peripheral) urban freeway. Via Verde is projected to absorb 27,000...
tons of noxious greenhouse gasses, 5,000 kg of particulates, and 10,000 kg of heavy metals per annum (Mexico News Network, 2016).

Critics have recently pointed out the high-costs of one such pillar; this is illustrated by juxtaposing one Via Verde column with planting three-hundred trees, at the same cost. From a global environmental perspective, this may prove a valid point. However, this comparison ignores the local noise-pollution, air-pollution, and aesthetic impact within Mexico City. The total cost of $16.6m has elicited some criticism despite the limited contribution from the public purse (Berdeja, 2016).

This eco-design solution may not be suitable for transformation of all of Toronto’s infrastructural greyscapes. However, it could provide a significant reprieve from the vertical grey monotony

FIGURE 4.1.2.A: VIA VERDE INSTALLED AND GROWING ON THE PERIFERICO FREEWAY (UMA GOTA NO OCEANO)
under the Gardiner Expressway and along Lake Shore Boulevard. It would be seasonal, as the Ontario climate would preclude most evergreen vegetation use. Winter’s grey and white palate is not foreign to locals. It could aid in the purification of the air, albeit coming off a much lower base of urban pollution compared to Mexico City. Perhaps most importantly to users of non-motorized transport, it will soften and humanize a very inhumanly scaled and constructed space.

A Via Verde solution does not work in isolation. It does not succeed in bridging physical divides, as it aesthetically glosses over divisions with a veneer of ecology and green space. It may aid in vertical habitat creation, even if it does not create actual horizontal space the pedestrian can enter. However, used in conjunction with other interventions, the approach could be invaluable to a holistic design solution. Albeit, this may not improve pedestrian access of the spaces under the freeway.

TAKEAWAYS >>>

- Following a green-agenda is desired, not only from an aesthetic point-of-view, but also in the interest of clean air and noise reduction.
- Not every single design element has to cater to the pedestrian experience. It can also aid in mitigating auto-oriented externalities.
- Soft landscaping does not only need to follow a horizontal build-out strategy.
- Botanical needs will need to be catered to the harsh Ontarian climate; however, this will provide seasonal variability and interest.
- Grey water and run-off should be used wherever possible.
- Lighting in conjunction with freeway pillar treatments should be used, both for night time aesthetics and safety of areas beneath highways.
- Freeway viaducts do not need to be dead areas, they just require a rethink and imaginative design.

DISCUSSION >>>

In the Via Verde example, even the most ecologically noble intentions could still draw the ire of some in the city, either for being a waste of monetary resources, or expending energy and time on what some may consider a frivolous design exercise. These public-interest criticisms should be anticipated and the most ironclad solution should be employed that can be defended on solid merits of the project, both environmentally and financially. While Canadians generally care for their environment, they are also frugal. Unnecessary expenditure which they postulate has little or no impact on them, or the city as a whole, will be met with opposition.
FACT BOX >>>

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Koog aan de Zaan is a residential community to the north-west of Amsterdam in The Netherlands. It is situated on the western bank of the Zaan River and forms part of the larger Zaanstadt Municipality. Coentunnelweg is a freeway with the A8 designation and cuts the community in two. Verzetstraat is the street the runs at grade to the A8, and used to denote a
significant physical barrier between the northern and southern sections of Koog aan de Zaan. It was a very symbolic division, with the community’s church and town hall on opposite sides of the freeway. At the time, the underpass was a mess of ad hoc parking lots and a shooting range. In 2003, the City Council of Zaanstad underwent a rigorous public consultation process, called A8ernA, to find solutions to merge the community to the north and south via the space beneath Coentunnelweg (A8).

Figure 4.1.3.B: Koog aan de Zaan A8 Park & Albert Heijn supermarket (Luuk Kramer)
As of 2005, the A8ernA urban public space came to be. As is common to many communities around the world, a grocery store is the essential amenity at the center of this neighborhood, fulfilling the vital need for food. The project provides for a small-craft marina in this riverside city, with a riverfront park which includes space for sitting, spaces for kids and teens, with sports and skating facilities. Through this, A8ernA created a vibrant space in what was previously a divisive, dead urban zone. NL Architects designed all this within the space beneath the A8 along Verzetstraat. Not only did they fulfil the ‘glamourous’ urban open space functions, but they managed to include the lesser functions of the parking lot and shooting range as well. In 2006, it was awarded the title of European Urban Public Space of the Year, jointly with the sea-organ steps in Zadar, Croatia (Bordas 2005).

The Albert Heijn supermarket seems to form the linchpin of the development, with public spaces being ‘themed’ to the west and east, from the grocer and associated parking beneath the A8
freeway. The west is primarily given over to spaces for play, including soccer and basketball courts, a graffiti wall, a table tennis area, skate park and breakdancing spaces. The eastern section boasts the aforementioned supermarket, a florist, and a fishmonger. Between these two retail elements is a brick-paved public space with freeway pillars converted into lighted accent walls (see image). Further east, the public space continues to the Zaan riverfront, encompassing the small-craft marina with its wood-panel treated freeway pillars (Kramer 2016).

As described, various sections of the underpass received various hard-landscaping treatments, diversifying the space, but also characterizing each space as a distinct ‘outdoor room.’ With the wood-pillar treatments, seating is included within the design. However, one can argue this is counterintuitive to current convention that advocates for movable public-space seating. The florist, Klavertje 8, has their plants and garden-wares spilling out into the public space, activating the expansive hardscape. The development does not ignore the freeway; it actively engages it with the pedestrian shoulder over the A8 Zaan River Bridge linking to the underpass space via a spiral staircase.

TAKEAWAYS >>>

- Urban freeways can either divide or bind; the way the areas beneath them is programmed determines this outcome.
- Parks are great, but sometimes essential community retail amenities are more effective in bringing people to and activating a space.
- Different environmental elements associated with the site, like water, should form part of the eventual design.
- Programming that caters to all age demographics of a community bolsters the design outcomes.
- Do not hesitate to integrate that which you wish to mitigate. Don’t turn away from the freeway completely, embrace it in design elements.
- Use of different materials gives the design more dynamism and can be used to define ‘outdoor rooms.’
- Freeway pillars can be used to define spaces.

DISCUSSION >>>

The Koog-aan-de-Zaan design is not a tremendously extravagant solution, but it works, is attractive, and it draws the neighborhood to what was once a divisive droscape. It has done the simple things correctly, without an extravagant or inflated budget. It won the aforementioned accolades for this reason. This is exactly what fiscally conservative cities want to hear: great outcomes for minimal capital outlay.

Toronto can take much from this non-glamourous example in simple interventions having large outcomes. Things as elementary as a diverse array of pillar cladding and paving, a well-placed and much needed neighborhood retail option, or an outdoor amenity for the urban youth; all these things can turn an underpass into a community gathering space and a place where the urban fabric is sewn back together.
The metropolitan region around Puget Sound has a resilient economy. Since the Great Recession of 2008 and onwards, the region has seen a higher than average rate of recovery. Large multinational corporations like Boeing and Amazon have seen rapid growth and have accounted for much of the basic-sector growth. The city is clearly growing and doing so in the highly-skilled labor sector. Both aforementioned companies’ employee-payrolls average at $100,000-plus per annum (Conway 2016). This has had the effect of a city growing out somewhat, but due to geography and lifestyle demands, often growing up. The ‘green agenda’ has also been prioritized in surrounding King County and in the City of Seattle’s policy. Although widely considered an attractive city, Seattle suffers from an acute lack of urban open space.
needs to be addressed to sustain inner-city residential growth. Lifestyle and environmental metrics factor in many people’s housing decisions in this region.

Freeway Park over Interstate-5 was the first of its kind in the United States and capped the urban freeway as a 2.23-hectare (5.5-acre) open space adjacent to the Washington State Convention Complex.
Center. It opened in 1976, and has an interesting and contentious design, including water features, soft landscaping, and brutalist, hand landscaping elements. Even though it may come across as a concrete maze, it mirrors the topography of this hilly host city, zigzagging its way from First Hill and downhill towards the city center. Although appearing monolithic, the concrete masses mask the surrounding traffic noise and stylistically mirror the towering skyscrapers of downtown Seattle (Landscape Voice 2012) (The Cultural Landscape Foundation 2016).

This is a city of major urban planning moves, from dismantling the Alaskan Way Viaduct and tunnel boring all of the downtown freeway, SR-99, to the Sound Transit 3 (ST3) ballot measure
passing in November 2016. ST3 has a price tag of $53.8bn for a 25-year build out, expanding Puget Sound’s public transit five-fold, becoming the largest public-transit works package in United States history (Mayo 2016) (Sound Transit 3 2016). The next major potential project is Lid I-5.

Lid I-5 aims to repair the urban fabric of Capital and First Hills in the east to Downtown and South Lake Union to the west, as Interstate-5 has divided these neighborhoods since the 1960s. In a city with rapidly growing land costs and 28,000 new households projected to call the urban-core home by 2035, urban open space acquisition is expensive. The design proposes capping I-5 from Pike Street (in south) to Belmont Avenue and Mercer Street (in north) interchanges, totaling over 18. 21-Ha (45-acres). According to the initiative, their studies of lid-parks across the United States calculated an average cost of between $4,951 and $6,189 per m² ($460 - $575/sqft.) to cap a freeway with green space. This compared to an average Seattle downtown land acquisition cost of between $10,764 and $21,528 per m² ($1,000 - $2,000/sqft.) (Lid I-5, n.d.).

The park aims to include various elements, such as affordable housing at the northern end, an amphitheater, bike and walking trails in between, then integrating into the Washington State Convention Center phase 2 project at the southern end. The plan also includes office development and a cultural center, and closely mirrors the dynamic topography of the site, fully utilizing the east to west down-grade over the sunken freeway below (Patano Studio Architecture 2016).
Seattle has numerous lid parks in place around the city and many more under development. Aubrey Davis Park on Mercer Island caps Interstate-90 with sports fields, playgrounds and green space (see Fig. 4.1.4.D). This provides park programming appropriate for a quieter neighborhood, but may require adjustments if adapted for inner-city needs.

Further north, upgrade work on SR-520 has seen the freeway get new separate bus and HOV lanes, with mass-transit-styled stations located in the median, connected to lid-parks, and associated with park-and-ride parking, traffic circles, and landscaped areas (see Fig. 4.1.4.E). Three lid structures have been constructed on the Bellevue side, with another mooted for Montlake on the Seattle side of Lake Washington.
The design may be overambitious for Toronto’s needs and frugal political climate. At a total area of 18.21-Ha and conservative estimates to lid a freeway in Seattle of $55.60m/Ha ($22.5m/acre), it would cost approximately $1.01bn to cap Interstate-5.

This is cheaper than appropriating private property, where cost estimates can double or triple.

Toronto could gain tremendously from property development and increased land-value.

Anchoring the south of the site, the $1.6bn (2020) Washington State Convention Center expansion will benefit. This could be a mirrored case with Metro Toronto Convention Centre and CN Rail.

Integrating development, urban amenities, green space, and commerce into a lid-project is not unheard of and completely doable, even in tough, tight, and topographically complicated areas.
DISCUSSION >>>

Although some of the solutions coming out of Seattle, for both urban freeways and urban parks, may seem appealing and visually enticing, the realities of what can be done in Toronto’s political environment are quite different. Just the passage of the ST3 ballot initiative would not be possible in Canada, as local authorities do not have that level of tax- and revenue-generating power. Even if Torontonians were overwhelmingly in favor of a one-percent hike in sales tax to make the TTC-Subway/Streetcar and GO-Rail systems world class, it would be nearly impossible to implement as it is unprecedented within the Canadian system of governance and devolution of powers.

The Seattle examples do provide us with a window into the alternatives and illustrates a picture of a city with a lack of inner-city open space, within a city with a burgeoning residential sector, like Toronto. It shows us what happens when urban open space provision becomes a must: is it more viable to expropriate land for this purpose, or repurpose the air above infrastructure to create land? Is there a point where maximum citizens’ benefit is exacted when parks not only are created, but also hide and mitigate that which makes the city less pleasant (but is essential to its functioning)?

Jennifer Keesmat, Toronto’s chief planner, has said as much in voicing her support for the Toronto Railway Central Park. There is no place, directly adjacent to or within downtown and the lakeshore, to build a new urban park. As great as the Toronto Islands are as quality space, this is not a place where you can pop in for a workday lunch, a pre-work jog, or walk your dog on a Thursday evening. It’s a weekend gem, but not accessible on a whim for working Torontonians. Thus we must find a way to roll out the provision of urban open space, if Toronto is to provide a healthy environment for its population.
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**Figure 4.1.5.A: Underpass Park & artwork (Ryan - Pan Am Art Relay | Flickr)**
Between Corktown and the West Don Lands, the Eastern Avenue Link with the Don Valley Expressway is the site of a local example of the public-space reclamation of an infrastructural drosscape. The Planning Partnership with landscape architects Phillips Farevaag Smallenberg, in the design of Underpass Park, have set a precedent in the Toronto downtown and waterfront areas for the reuse of derelict spaces.

It is a multi-functional space that aims to use the infrastructure to its maximum advantage in its repurpose. Thus, the design uses the viaduct to provide shelter from the harsh elements. The pillars are repurposed into colorful works of graffiti-art that transforms into conduits and distributors of up-light at night. The park design also reimaged works of engineering, such as bridge pillars, into porous dividers creating outdoor rooms, with some rooms used as playgrounds for the kids, others used for urban art, and others repurposed for teens and adults as skate parks and basketball courts. It provides for an urban-sports space in, what would otherwise be, a space that would be avoided by the community.

The use of urban art and innovative elements creates a dynamic space that makes the community, and especially the urban youth, feel like they have a friendly, urban, open space. The use of graffiti-art on pillars recreates the feeling of ‘tactical urbanism’ through visually ad hoc urban art, despite it being premeditated, clean, and inoffensive. This is augmented further through the Paul Raff Studio’s installation of fifty-seven octagonal mirrors beneath the bridge eye-beams. In conjunction with the LED up-lights, it creates a lightshow and color-play in a previously colorless and soulless space (Waterfront Toronto 2016) (Tomlinson, 2013).
TAKEAWAYS >>>

- Viaduct pillars can be used as light displays and used as a canvas for urban art.
- Lighting should form part of the aesthetic and safety features of the site design.
- Design treatments of the eye-beam ‘ceiling’ beneath the viaduct can add new dimension to the project and create three dimensional interest.
- Toronto is not a stranger to the repurpose of urban infrastructure, it simply needs impetus to be bolder and expand their scope, i.e. The Bentway.
DISCUSSION

Underpass Park probably goes the furthest when it comes to treating an under-viaduct space as a fully three-dimensional design canvas. The ‘ceiling’ treatments are innovative and create a unique outdoor space unlike those seen in most ‘below freeway’ parks. This can inform design decisions for The Bentway and solutions for the Gardiner Expressway and CN Rail project.

This project also clearly displays the use of LED lighting for design (see Fig. 4.1.5.B). This is a relatively easy, cost-effective, and low-maintenance way to create an interesting effect, all while improving security after dark. Lighting can easily turn an infrastructural barrier into a colorful icon of engineering. It may not aid the daytime aesthetic, but it creates a night time work of art without additional construction work or affixing any additional cladding.
South-east of the city of Auckland in the neighborhood of Mount Wellington is the South Eastern Highway. The Sylvia Park Shopping Centre is innovative in that it bestrides a busy, elevated arterial route, being constructed on both sides and underneath it. However, the spaces leading to it from the parking areas underneath the viaduct structure presented a formidable and dark greeting to potential shoppers.

The project is not remarkable in its scale or public investment, but rather in its imaginative use of foreboding space. The design intervention perhaps best displays how it makes good economic sense to make sure the public realm is enticing. The space does not link anything of particular urban importance to the Mount Wellington neighborhood, instead simply acting as a colorful and whimsical space between where a patron parks and where he/she would enter. This provides a good case-study for how private property...
owners with foresight are also seeing the benefits of investing in their urban surrounds (Laud8 2010).

TAKEAWAYS >>>

- Infrastructural retrofits are not the sole realm of the public-sector. Private developers benefit from investing in their surroundings.
- The use of color is a simple, inexpensive and quick way to liven up foreboding spaces.
- Performing basic interventions, however simple and inexpensive, can still go a long way in livening up a very foreboding space.
DISCUSSION >>>

This project shows the private sector may also be leaned upon for urban upgrades that may not seem to be part of their core development strategy. However, the knock-on effects can be leveraged to convince the private sector that investing in such amenity is in their best interest. Also, not all spaces require capital-intensive, large-scaled and elegant solutions to create a profound impact. In areas where private and public sector interest is lackluster, small interventions which provide for maximum visual impact with minimal investment is very plausible.
4.2 | Rail Projects | Park, Precincts & Lid-Developments

Similar to the section on urban freeway case-studies, this section follows the same format. However, these case-studies have been selected for their design prowess in addressing and retrofitting railways, marshalling yards, and rail-associated infrastructural landscape.

Birmingham’s Curzon HS2 Masterplan was selected to highlight transit-oriented development and leveraging location in property development. Millennium Park is Chicago is a well-known example of creating a signature public space above a railway yard and has elements of public-private funding cooperation. Melbourne’s Southern Cross and Federation Square examples display rail infrastructure interfacing with public amenity and being porous to the streetscape. New York’s Hudson Yards is the largest rail-capping project in the world, and displays strong components of green infrastructure, energy management and private investment. Jardin Atlantique at Gare Montparnasse in Paris has strong landscaping symbolism in a successful inner-courtyard design. Philadelphia’s proposed 30th Street Station District models itself around Hudson Yards, attempting to replicate its success. Washington, DC’s Burnham Place is using air-rights to create space in a city rapidly running out of it.
4.2.1 | Birmingham, UK | CURZON HS2 MASTERPLAN

FACT BOX

<table>
<thead>
<tr>
<th>POPULATION</th>
<th>3,834,600 (2012</th>
<th>Metro Area)</th>
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<tr>
<td>POPULATION DENSITY</td>
<td>4,102 persons/km²</td>
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<td>POPULATION GROWTH</td>
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<tr>
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<tr>
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<td>GDP per CAPITA (USD)</td>
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<td>New transit gateway needed for HS2 rail</td>
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<tr>
<td>SOLUTION PROPOSED/IMPLEMENTED</td>
<td>Masterplan for new station &amp; TOD district</td>
<td></td>
</tr>
<tr>
<td>COST OF SOLUTION</td>
<td>$1.13bn</td>
<td></td>
</tr>
</tbody>
</table>

The United Kingdom is known for being frugal with large capital expenditure and flashy public projects, when compared to other European nations. However, Birmingham has been quite revolutionary in the way they have organized their inner-city infrastructure and created some interesting retail and public spaces, with a mix of the old and new.

With the announcement from National Rail UK of High Speed 2 (HS2), Birmingham will be within forty-nine minutes of London-Euston via high-speed rail. The H2S project places Birmingham within daily commuting distance of this primate city, which may facilitate the pseudo merging of the economies of England’s first and second largest metropolitan areas (GaWC: Loughborough University 2012). HS2 will go on to link Manchester, Leeds, and Sheffield to London via Birmingham-Curzon in phase two of the project. All the Midlands cities will be within one hour’s travel time, hence the need to enlarge the transport and associated TOD development associated with Curzon Station in central Birmingham.

The Birmingham Curzon HS2 Masterplan, at 141-hectares (348-acres), is reported to cost the city a total $1.13-billion (£900-million) and will take a period of thirty years to reach full build out,
including all the associated urban regeneration districts. By 2046, the development will include a mix of 700,000m² (7.53m sqft.) of developable floor-space, with 600,000m² (6.45m sqft.) gross given over to employment creation functions. The land-use and zoning (vertical and horizontal) mix is as follows:

- Office 420,000m² (4.52m sqft.)
- Employment (B2/B8) 100,000m² (1.08m sqft.)
- Residential 4000 units
- Retail (A1-A5) 100,000m² (1.08m sqft.)
- Hotel 60,000m² (646K sqft.)
- Leisure 22,000m² (237K sqft.)
- Community 82,000m² (838K sqft.)
In addition to the land usage outlay, the masterplan outlines different development priority zones, *places for growth.* The zonation of the project forms the cornerstone of the overall plan for the precinct, including:

- **Arrival:** A connected city with a landmark station that is widely accessible and a catalyst for growth.
• **Retail**: A redesigned High Street with additional connections and redesigns to activate frontages.

• **Visit**: Millennium Point and Eastside City Park will be enhanced with Curzon’s redevelopment.

• **Creative**: The historic Digbeth neighborhood will be catalyzed with new canal-side residential developments and a metro line. Creative and high-tech industries will be incubated with the help of new HS2 lines to London.

• **Business**: Martineau and Exchange Square form a link between HS2 line and the existing CBD, providing for excellent business and office opportunities.

• **Research & Learning**: The Birmingham Science Park Aston and BSU-campus provide the catalyst for the continued growth of research, business technology and educational focus in this area, along with a proposed mixed-use development.

Masterplan documents continue to claim the construction phase will create 1,000 full-time employment equivalent opportunities and 36,000 net jobs for the duration of the project (Nazir 2015). This comes off the back of a real-estate atmosphere of decentralization on the U.K., as Birmingham is seeing a property boom with the likes of HSBC relocating offices here. The Urban Land Institute and PricewaterhouseCoopers back the city as the best place to invest in property in the U.K (Fraser 2016).
TAKEAWAYS

- Transport infrastructure is a catalyst for growth and development, but with one caveat: It stimulates where people alight, but can deaden where people speed by. The key is to maximize the former and innovatively counteract the latter.
- Ensure the design has a large employment stimulus; nothing can galvanize public-opinion and legitimize capital expenditure better than improved economic prospects.
- Whilst the Curzon Masterplan has a European-style mixed-use development typology, it does priorities the zoning of certain critical activities in ‘places for growth’, ensuring each aspect enjoys some developmental focus.
If the capital-spending averse United Kingdom can do this, it may find traction in frugal Toronto.

DISCUSSION >>>

This is by no means a small project, but certainly shows the possibilities of what can be done in a climate of frugal government, quite familiar to Canada and most commonwealth nations. The development also displays a foresight of urban developmental and residential patterns. This is something that must be taken into consideration in Toronto, with its rapidly growing populace.

The Curzon development also effectively ‘themes’ various areas of the development, without going the way of Euclidean zoning. This may seem counterintuitive to inclusive and integrated development. However, if mindful of not thinking in silos, the ‘theming’ or compartmentalization of the project enables one to not lose focus of certain urban targets and niche needs.

The project is focused on TOD (transit-oriented development). Losing sight of this key transport-focused design element at the Toronto lakefront will be detrimental. The ability of a resident, worker, or someone coming to play, to access the area or to leave the area, will be paramount to its desirability and potential success. For example, the ease of a resident to access Toronto-Pearson International within thirty minutes may mean the difference between a property being sold or not.
4.2.2 | Chicago, IL | MILLENNIUM PARK

FACT BOX >>>

<table>
<thead>
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<th>FACT</th>
<th>VALUE</th>
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<td>POPULATION</td>
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<td>POPULATION DENSITY</td>
<td>4,582 persons/km²</td>
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<td>POPULATION GROWTH</td>
<td>0.95% p.a. (2001 – 2011)</td>
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<td>GROSS (city) DOMESTIC PRODUCT (USD)</td>
<td>$563bn</td>
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<td>GDP Growth</td>
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<td>GDP per CAPITA (USD)</td>
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<td>URBAN ISSUE AT HAND</td>
<td>Unfinished urban park on lakefront - rails</td>
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<tr>
<td>SOLUTION PROPOSED/IMPLEMENTED</td>
<td>Lid over bus terminal &amp; rail yard with park</td>
</tr>
<tr>
<td>COST OF SOLUTION</td>
<td>$475m</td>
</tr>
</tbody>
</table>

Daniel Burnham, when he designed the Chicago Plan, envisioned a ‘city beautiful’ with a great, green interface with Lake Michigan. This 1909 vision remained a pipe-dream for almost a century.

In 2004, the masterplan of Skidmore, Owings & Merrill LLP (SOM) saw Millennium Park come into being. SOP claims the 6.88-Ha (17-acre) project it is the largest ‘roof garden’ in the world. It is the urban open space crown atop bus lanes, parking garages, and a rail yard (SOP n.d.).

Millennium Park, as a part of the greater Grant Park, is a collection of outdoor spaces, gardens, lawns, venues of various types and exhibition and urban art spaces, rather than a park of singular function and form. It has also become a showcase for cutting-edge and sometimes controversial outdoor art installations and works of architecture and creative engineering. The park has joined the ranks of some of Chicago’s most visited sites and has become an urban icon for the Midwest.

The Jay Pritzker Pavilion and great lawn centers the design. The massive brushed stainless steel swirls adorning the concert stage roof and arch truss lattice over the great lawn are iconic for the
musical and orchestral performances which take place here. A state of the art sound system, with its equal distribution throughout the seated section, mimics the acoustics of an indoor venue.

The BP Bridge is a functional metallic snake linking the great lawn to Daley Bicentennial Plaza and acts as a traffic acoustic barrier for S. Columbus Drive. The bridge, and the aforementioned structures, were all designed by Frank Gehry.

The Cloud Gate sculpture by Anish Kapoor is a 112-tonne ‘bean shaped,’ amorphous structure of warped but high reflectivity – a place of wonder for park visitors to view the skyline in odd, mirrored form, or to photograph one’s contorted reflection.

The two Crown Fountains are in the west of the park site. They are 15.2m (50-ft) tall and each features cascading water during the warmer seasons, backed with huge LED screens projecting artful images of Chicagoans. The towers are set in a reflecting pool in a public plaza.

Wrigley Plaza houses the almost perfect replica of the peristyle, now called the Millennium Monument, which adorned the same site from 1917-1953. It acts as an anchor to the world-famous Michigan Avenue which runs to the west and northwards up Miracle Mile.

Boeing Galleries is a contemporary art installation within the park. The Lurie Garden is a beautifully appointed 2.02-Ha (5-acre) garden. The BP Cycle Center is a fully outfitted cycle clinic, with bike rental, lockers, and showering facilities. The Harris Theater is also on site and hosts all manner of musical and performing arts. The four Exelon Pavilions at each corner of the great lawn are glass cubes used to convert solar energy to electricity, but also double as a visitor’s center, and entrances to the parking and bus structures below (City of Chicago 2010).

Millennium Park offers a plethora of activity and abounds in art and architectural wonder, from the built-form to the botanical. As with many municipal infrastructural projects, Millennium Park
was way over budget. Initially it was supposed to cost $150m, but by 2004, this price had ballooned to a total of $475m, $270m of which was borne by private donors, with taxpayers footing the rest (Cohen et. al. 2004).

**A tour of Chicago’s Millennium Park**

**FIGURE 1: AXONOMETRIC DIAGRAM OF MILLENNIUM PARK (CITY OF CHICAGO, SKIDMORE, OWINGS & MERRILL LLP ET. AL.)**

**TAKEAWAYS >>>**

- A lid-park can be a city’s biggest icon and green asset.
Corporations can be co-opted to assist monetarily in the creation of urban art and public space without completely selling out to their interests.

Expect push back from critics, even if the outcome is in the public-interest and elements therein have a greater purpose for the city.

Even in a limited site, the potential for varied spaces, uses, and themes is great.

Outdoor venues and performance space can thrive in a harsh (cold) climate.

It is possible to use water in these harsh climes, just ensure their seasonal deactivation is easy and it remains a purposeful space in below-zero temperatures (°C).

Large thoroughfares intersecting a site can be surmounted with creative engineering solutions that are both of form and of function.

DISCUSSION >>>

While we may find that private monetary contributions to public projects may not be as forthcoming in Canada, we can still learn from the Chicago example of sharing the cost-burden between the public and private sector. It is claimed that strides are being made towards more active private-public partnerships in Canada’s urban development (Tahair & Bowen 2016).

There were cost overruns in the Millennium Park project. These were shared in an approximate 57% private, 43% public split of the total. Although not ideal, granting naming rights in exchange for public amenity or urban art could be a viable route in the name of cost-saving. Few tourists or residents are perturbed by the fact that Cloud Gate sits within a plaza with a telecommunications company namesake. This is could be permissible in the case of Toronto, provided that the design and development guidelines ensure that public amenity is indeed a public, not private, asset and that naming rights does not sully, cheapen, or brand the urban environment. We need to create landscape, not brandscape.
As a city center wrapped with rail infrastructure on two sides, Melbourne should have an orphaned and poorly connected downtown. The above-grade part of the City Loop Rail separates the downtown from the Yarra River that runs through it. Despite this, the Yarra River is a lively corridor of intense urban activity, with a booming Southbank precinct (a commercial high-rise district) and the Docklands to the west, an up-and-coming mixed-use precinct, revitalizing underutilized post-industrial space. Melbourne, once the world’s most livable city, has fallen in the rankings to number 15, tied with Toronto in the rankings (Mercer Quality of Living Rankings 2016).

A good livability metric does not imply that the entire railway periphery is without fault. Numerous places still display a weak sense of place. Many underpasses are still in deep shadow and uninviting. Some overpasses may look neat and clean, but don’t inspire traversing on foot.

In some instances, this divide is dealt with through some good design interventions. St. Kilda/Swanston Street punctuates the center of the CBD’s Hoddle Grid and forms the north-
south link to the Southbank (Smith 2014). The State Theatre, St. Paul’s Cathedral, and Flinders Street Station are landmarks on this thoroughfare, which is precisely where Melbourne activated the cross-rail link. The tourism gateway to the city and the architecturally iconic, mixed-use, Federation Square was placed over the rails at this pivotal location. The street corner here is a vibrant and busy multimodal space. Bike lanes, car lanes, sidewalks, and tramways all vie for a piece of the right-of-way (Google Earth Pro 2016).

Federation Square is the most decorated development in the Victorian chapter of the Royal Australian Institute of Architects’ history. Constructed over a period from 1998 to 2002, it was fraught with cost overruns, with a final price-tag of $370m (2002 eq.). It was the most extensive railway capping project in the nation at this point and was to be the city’s new premier public space. The square’s high profile in a diverse city was espoused in the architecture and layout, being almost prismatic and jumbled in its non-rectilinear form and zinc, sandstone and glass façades. Purposefully done, it was an architectural personification of the disparate parts of a cohesive whole of a modern federation (Hannan 2003).

The development itself has become a cultural, social and innovation hub for the city, hosting 2,400 public events per annum. It has also become one of Australia’s major tourist destinations, with 20 million visitors per annum (Vidiella 2007, 60). It has mixed-use buildings set amongst cascading public space. It is diversely programmed space that combines public and private forms of activity. Despite having budget overrun controversies, it melds the cultural and arts tapestry of Melbourne and interacts well with Flinders Street, the station across the plaza and iconic St. Paul’s Cathedral. It also reconnects the city to the Yarra River via Federation Wharf (Fed Square Pty Ltd 2016).
Figure 4.2.3.A: Federation Square with the Yarra River to the Southbank (Steve Parish)

Figure 4.2.3.B: Map of Fed. Square (Monash University Medical)
Nearby Southern Cross station, formerly known as Spencer Street Station, underwent massive reconstruction for the 2006 Commonwealth Games. The station also forms part of the Docklands redevelopment, thus providing a metaphorical and literal bridge over the City Loop between the CBD and the new redevelopment to the west. Multiple vital urban functions, like office and retail, were integrated into the $534.4m (2002 eq.) redesign.

The 60,000m² (646K sqft.) station’s blurred edges and open-feel ensure line-of-sight within the concourse and out to the streets of Melbourne. Collins Street, despite being above grade to bridge the rail lines, became the new de facto ground level, as the station interfaces directly with this ‘new level.’ The addition of street trees gives this illusion further design momentum. The station was built to a capacity of 15-million passengers (DesignBuild Network 2016). In 2017, that has been exceeded by 2-million.
The Bourke Street Footbridge is a visually appealing way to traverse the northern end of the station across the City Loop rail lines. The pedestrian footbridge links the Etihad Stadium and northern Docklands to the CBD. It is adorned with artistic amenity lighting, faux-suspension structures, and colorful paved spaces and green areas. It links well with E. Bourke Street and aligns with the Hoddle Grid. However at W. Bourke Street, the footbridge diverges from the Docklands street network and the two-story above-grade linkage is less than intuitive to the pedestrian, unless approaching from Etihad Stadium (Google Earth Pro 2016).

Reports are positive and have resulted in an increase in transit usage, in that now, the City Loop and associated stations are operating above capacity. This has prompted Public Transport Victoria (PTV) to design a new $8.4bn Metro Rail Tunnel cutting across the City Loop to alleviate transit demand. This has a negative side, in that not ten-years after significant spending by the PTV, the station can no longer handle passenger demands. Criticism is mounting that little foresight and passenger projections went into the planning of Southern Cross (Australian Broadcasting Corp. 2016).
Catalytic intervention is key in infrastructural retrofit placemaking and redesign. Thus, picking a point-zero or critical nexus is vital for a phase one targeted intervention.

Rail stations that have an open interface with the street (their surroundings) and have ambiguous edges can go a long way in reactivating urbanity around them.

Where possible, integrate paths with existing street grids and patterns of movement.

Make thoroughfare entrances intuitive, especially when there is a grade-change.

Climate may preclude Toronto’s ability to mimic the openness of Melbourne’s solutions.
- Beware of a project unprepared for success. Proper projections and planning needs to factor in latent demand released by the area/infrastructure’s redesign and redevelopment.
- Hard landscaping and cladding materials can in itself place-and-time make, speaking the story of the city.
- Building and structural forms and their orientation add to the intrigue and can also tell a story.
- The more you mix uses, the more activity will catalyze.
- Celebrate diversity, innovation, and creativity in design, and this will inspire the same to occur in the space designed.
- Be prepared for cost overruns; they will almost certainly occur.

DISCUSSION >>>

Melbourne can teach many lessons as a loveable city, but in this case, the lessons pertain to the inner-city loop of railway and making sure the Melbourne CBD is not left isolated from the outside urban fabric. This has been achieved by making sure stations and their associated precincts relate well to the street fabric and pedestrian spaces.

In the case of Federation Square, a multifunctional events and amenities space was constructed atop the rail lines, with a great relationship to the surrounding streets and Flinders Street Station. This is a profound lesson in placement of something new in an urban ocean of things that already exist. Context cannot be ignored. In the Toronto case, whether it is Lake Shore Boulevard, the rail lines, the CN Tower, a new high-rise apartment, or Queens Quay, any new interventions needs relatability to its surroundings and to the host-city’s climate.
Melbourne succeeds in opening the structures, street edges, and squares, making the stations and public buildings permeable. This is a foremost urban design wish, but requires major design adjustments to ensure it works at either 25°C or -10°C, facilitating success in a Canadian climate.

Federation Square celebrates Australia’s history through the use of differing building materials and architecture. Subtle imagery of the land and its culture are etched within the design elements. This too is a serious consideration for thoughtful development in Toronto. The current development form may seem devoid of Canadian-context. The bridging of the infrastructural divide in Toronto surely should integrate these elements in its design. Creating place also involves creating place within place: thus, the design of urban spaces that are contextually akin to their host city and nation.

Change of grade integrated design and the congruency of new paths into the existing city street network is paramount. Traversing CN rails without expensive burial will require grade changes in north-south pathways. Doing so will require merging into the street fabric intuitively and seamlessly wherever possible. Southern Cross Station and the extension of the Hoddle Grid towards the Docklands displays this balancing act in Melbourne.
Hudson Yards is alleged to be the largest single real-estate project in United States history, incorporating retail, commercial, hospitality, residential and three urban parks, all in one, massive reclaimed space along the Hudson River. Ground-breaking took place in December 2012 and it will be phased into eventual completion in 2024. The completed price tag of the project is projected to top $20-billion. The project is an 11 Ha (28 acre) cap and redevelopment of the West Side Yard, a large unsightly piece of rail infrastructure on Manhattan’s far West Side (Levitt 2016). The project creates a mixed-use precinct, with parkland also included within the masterplan.

The thirty rail lines remained active during construction, and caisson works took place between the working tracks between 2014 and 2015. Each is between 1.2m and 1.5m (4ft – 5ft) in diameter and is cast to a depth of 6.1m to 24.4m (20ft – 80ft). The high-rises and platform is laid atop the caisson foundation structure. Included in the below-grade works is the extension of the no.7 Subway line to the site, costing $2.4bn to complete.
The well-known Highline Park was extended through the site and now terminates at 12th Avenue and West 34th Street, finally completing the entire old, elevated, rail line retrofit. This third phase was done at a cost of $190m. Despite costs, the Highline has seen considerable returns on investment, as the Hudson Yard developer’s claim this infrastructure-park retrofit has already spurred $2bn in private investment and created 12,000 permanent jobs in the immediate area since 2009. At the skyscraper completed in 2016, No.10 Hudson Yards, the Highline is integrated into the actual building (Related Companies, L.P. 2016).

![Figure 4.2.4.A: Highline looping around Hudson Yards (Andres de Wet)](image-url)
The provision of so much urban open space on site is not by accident; it is a by-product of what lays beneath the site. Only 38-percent of the site can support habitable structures. This is due to the careful placement of caissons over the working rail lines, coupled with the underlying geology and tunnel locations. Thus, developers have focused on high-profit and high-density wherever construction is possible on the site. Although they claim affordable housing is allocated to 25-percent of residential property in Hudson Yards, critics claim this may just be nomenclature for studio units, generally unsuited to families and many of those with housing needs.
Hudson Yards will be far more than a collection of tall towers and open spaces. It will be a model for the 21st century urban experience; an unprecedented integration of buildings, streets, parks, utilities and public spaces that will combine to form a connected, responsive, clean, reliable and efficient neighborhood.

**CONNECTED NEIGHBORHOOD**
Communications will be supported by a fiber loop, designed to optimize data speed and service continuity for rooftop communications, as well as mobile, cellular and two-way radio communications. This will allow continuous access via wired and wireless broadband performance from any device at any on-site location. We’re as good as future-proofed.

**RESPONSIVE NEIGHBORHOOD**
Hudson Yards will harness big data to innovate, optimize, enhance and personalize the employee, resident and visitor experience. Supported by an advanced technology platform, operations managers will be able to monitor and react to traffic patterns, air quality, power demands, temperature and pedestrian flow to create the most efficiently navigated and environmentally attuned neighborhood in New York.

**CLEAN + RESPONSIBLE NEIGHBORHOOD**
Progressive cities are moving toward organic waste separation systems to reduce landfill costs, methane emissions and greenhouse gas emissions. Hudson Yards makes organic waste collection convenient and space efficient by utilizing grinders, dehydrators and bioreactors to convert food-service organic waste to dry fertilizer at 10% of its initial weight and size.

Additionally, nearly 10 million gallons of storm water will be collected per year from building roofs and public plazas, then filtered and reused in mechanical and irrigation systems to conserve potable water for drinking and reducing stress on New York’s sewer system.

**RELIABLE + EFFICIENT NEIGHBORHOOD**
Whatever the disruption—super storm, brown out—Hudson Yards will have the onsite power-generation capacity to keep basic building services, residences and restaurant refrigerators running. It doesn’t hurt that being built above a rail yard means our first level is well above the flood plain.

Hudson Yards’ first of its kind microgrid and two cogeneration plants will save 24,000 MT of CO2e greenhouse gases from being emitted annually (that’s equal to the emissions of ~2,200 American homes or 5,100 cars) by generating electricity, hot water and chilled water for the neighborhood with over twice the efficiency of conventional sources.

HudsonYardsNewYork.com
The development includes innovative technology in energy and waste management. The Envac pneumatic-tube trash removal system runs throughout the development and mimics a three-bin system of recyclables, food waste (for composting/fertilizer), and trash (destined for a central dehydrator). This eliminates the need for trash-collection trucks on site and reduces waste, offensive smells and noise. On the energy front, Hudson Yards will have a smart grid with a central cogeneration plant that can keep the lights on, no matter what impacts the general electric grid. Buildings are also linked by a thermal loop, allowing them to exchange heat and chilled water to maximize energy efficiency (Mattern 2016).

The development has ballooned to the stage where it will rival Midtown and the lower-Manhattan Financial District, becoming a new office and commercial hub in New York. The newest addition of an 11.3 Ha (28 acre) site, to come online in 2025, will have more office space than the whole of downtown San Diego (Levitt 2016).

TAKEAWAYS >>>

- Even with vast amounts of capital input, geology and what exists on and beneath the site will limit what can be constructed.
- Innovative ecological and energy saving solutions can benefit both developers and potential buyers and tenants.
- Being efficient may take short-term effort, but in the long-term, results in considerable savings and value-generation.
- Investing in urban amenities and open space can have considerable economic spin offs, with the Hudson Yards official site claiming the Highline has generated $5-billion in direct investment in western Manhattan.
Admittedly, the ability of Toronto to replicate what has been done at Hudson Yards may be limited. Few cities, globally, will have the intensity and scope of this level of capital investment in one project. However, elements of the project can provide case-studies and ideas for some best-practices in design, particularly in the arena of innovative urban open space provision and green infrastructure inclusion.

It is also important to note the catalytic economic impacts in providing an integrated and well-appointed park system in a dense urban core. It is often seen as a large public investment without an immediate monetary return. This is not the case, however. As the Highline has proved, the western edge of Manhattan, once a low-rise, less-than-desirable, and somewhat industrial sector of the city, is now a sought after and rapidly developing urban precinct.

Toronto too, can benefit from such interventions, provided the foresight is there to invest proactively. Yet the socio-political climate in Ontario has seen the city often acting more reactively. This type of urban planning strategy is not going to reap the large gains that a well thought out spatial plan would have. Learning lessons from Hudson Yards and implementing similar, but much smaller-scaled, interventions between the Toronto CBD and the lakeshore could have a tremendous catalytic economic impact and greatly impact land values.
Paris, France | JARDIN ATLANTIQUE & GARE MONTPARNASSE

FACT BOX >>>

| POPULATION | 12,492,500 (2014) |
| POPULATION DENSITY | 21,000 persons/km² |
| POPULATION GROWTH | 0.95% p.a. (2001 – 2011) |
| GROSS (city) DOMESTIC PRODUCT (USD) | $715.1bn (2014) |
| GDP Growth | 0.7% (2014) |
| GDP per CAPITA (USD) | $57,241 |
| URBAN ISSUE AT HAND | Rail station refurb for TGV in urban space |
| SOLUTION PROPOSED/IMPLEMENTED | Over-rail development & public-space |
| COST OF SOLUTION | $ 13.8 m (landscape build-out) |

Paris is often lauded as the city at the forefront of aesthetically pleasing urban design, as Hausmann’s urban outcomes famously inspired the City Beautiful movement. One landmark maligned by many Parisians, the Tour de Montparnasse, is the location for a signature rail-cap project. Here, above the SNCF (Société Nationale des Chemins de fer Français) and Métro lines at Gare Montparnasse is the Jardin Atlantique, a 3.4 Ha (8.4-acre) park opened in 1994 and enclosed by mostly office blocks, with an outer ring of retail.

The garden has a nautical theme, with overtones of Greek mythology of the oceans, as the garden is placed above the rail link between Paris and the Atlantic seaboard destinations. Themed areas, such as sand dunes, coastal grasslands, and waterfalls give it a maritime feel. Tennis courts and water-play areas are included herein.

Jardin Atlantique is between seventeen (northern end) and seven meters (southern end) (56ft. and 23ft.) above street level and is supported by twelve batteries of arches above rail tracks. This limits the depth of soil available for planting, but it has been achieved, with 180cm-depth (71in.)
for treed areas, to just 20cm-depth (8in.) for grasslands (Jardin Atlantique, Paris 2017; Les Parcs et Jardins 2017).

Its aesthetic, an interior courtyard made to feel like a ship deck, has left the garden relatively hidden and it does not interface well with the surrounding urban fabric. It is a hard to find green space, above street level, in an arrondissement with few other open spaces.

**Figure 4.2.5.B: Jardin Atlantique above Gare Montparnasse - cross section (François Brun)**

**Figure 4.2.5.C: Jardin Atlantique from Tour Montparnasse (Jim Linwood)**
TAKEAWAYS >>>

- Various limitations may apply to green space in lid-structures, but these can be overcome, including ventilation, underlying supports, and allowable soil depth.
- Symbolism and themed design can be used to create sense of place or play homage to what lies beneath the rail/road cap.
- A grade change can be a divisive factor (if poorly designed) and hide a perfectly usable open space.
- Other sports amenities and nature-play opportunities can be exploited in such cases, if the proposed park programming supports such amenity provision.

DISCUSSION >>>

Jardin Atlantique provides us with a clear example of landscaping ideas and pitfalls to be encountered when planting and designing above rails. It is also a good case-study in create a sense of place out of what already exists; taking a rail route to the sea and giving the park above the feel of the destination. This gives the place a clear identity and Toronto should not shy away from making any proposed capping project uniquely Torontonian.

The area between downtown and Lake Ontario is developing as a highrise residential hub and any park development must carefully consider the recreational needs of residents, including both active and passive amenity space, as well as playscapes that are attractive to various ages. With grade changes, a design must be careful not to isolate new investment from the existing street fabric (this to be discussed further in 4.2.7). Jardin Atlantique hides itself, rather than opens itself up to its surrounds.
Philadelphia is coming out of a long period of inner-city stagnation. It is reclaiming its place as a major U.S. city by proposing an extremely ambitious project to cap the rail lines north of 30th Street Station, just west of downtown, across the Schuylkill River. The area consists of 35.6 Ha (88 acres) of rail yards, to be converted into a mixed-use precinct over the next 35 years. It is touted to create 16.2 Ha (40 acres) of new public open space and 1.67-million m² (18-million sqft.) of new development. This development will take place atop working rail infrastructure, as seen in New York’s Hudson Yards (Philly District 30 2016).

The development leverages its location as the third busiest AMTRAK-hub in the United States, with its linkages to trolley lines, NJ-Transit Rail, SEPTA-subway, and several bus routes. The 30th Street Precinct aims to improve civic space and improve walkability, linking the development with the existing downtown, the Schuylkill River, and strong institutional structures in the vicinity. It also stands atop a critical transportation nexus in the U.S. Northeast Corridor, where north-south rail lines converge on westbound lines to the Pennsylvania interior and Midwest.
The development will require $2bn to be spent on roads, bridges, parks, utilities, and the expansion of transit services, unlocking a further $4.5bn in private real-estate investment, as rail cap air rights are opened up. An additional $3.5bn is earmarked for the adjacent Schuylkill Yards Project. It is projected that upon completion, the two developments will generate $3.8bn in State and City taxes and create 40,000 jobs upon completion. Amtrak, SOM and local press-releases fail to clarify the period over which these monetary returns will be earned.

The development is focused on creating an urban neighborhood where the three urbanist tenets of live, work, and play are espoused. A holistic view of precinct users has been taken, ensuring that daily commuters, long distance commuters, visitors to the city, nearby faculty and students, as well as local residents and workers are considered in the site’s programming and design (Skidmore, Owings & Merrill LLP 2016).
FIGURE 4.2.6.A: PHILADELPHIA AERIAL OVER TIME WITH 30TH STREET PRECINCT ON THE SCHUYLKILL RIVER BEYOND (TOP: GOOGLE EARTH; BELOW: SKIDMORE, OWINGS & MERRILL LLP)
The masterplan may appear as an expensive development option, but this is phased over 35-years to 2050 and beyond.

Philadelphia has an established urban open space system under the Philadelphia Plan – despite this, the 30th Street Precinct masterplan includes new civic and green space, along with NMT-activated greenways. This will expand upon Philadelphia’s open space system by providing more of it on a bank of the Schuylkill currently lacking it.

Proposed parks along the Schuylkill River and Interstate-76 semi-daylight the urban freeway, integrating infrastructural-function with green-form.

The project acknowledges and articulates the needs of all potential precinct users.
DISCUSSION >>>

The figures around the possible economic spin-offs will be of interest to a possible Toronto solution for the lakeshore. In this 35.6 Ha (88-acre) development, of which only 19.4 Ha (48-acres) will be developable (remainder given over to open space), $3.8bn is projected to be injected into the Pennsylvania and Philadelphia tax coffers. There is definitely a cost to the transit agencies, the city, and the state, with a $2bn initial capital injection required for public-goods and infrastructural improvements. However, it is clear that this is a capital investment for valuable real-estate investment. Cities with cold real-estate markets may have issues in recouping capital outlay costs; Toronto’s current real-estate climate is hot.

There is also a lesson to be learnt about the determination of usability metrics across all user-groups. Awareness of user-groups ensures that any development or potential change to the public realm takes all citizens into consideration. User-group awareness should be a good method to use to ensure any design solution impacting Union Station, Lake shore Boulevard, and surrounds has a positive effect on all user-groups. It must, in the least leave the sum better off than any one potential negative impact (Pareto Optimal). The Philadelphia project has also prioritized the creation of urban open space, without compromising the need for real-estate development and income-generation. The urban districts employed therein can be applied to effective districting in a Toronto solution.
4.2.7 | Washington, DC | BURNHAM PLACE & UNION STATION

**FACT BOX**

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<tr>
<td>SOLUTION PROPOSED/IMPLEMENTED</td>
<td>Over-rail mixed-use development</td>
<td></td>
</tr>
<tr>
<td>COST OF SOLUTION</td>
<td>$7.5 bn: Union upgrades, $1.5 bn: air-rights dev.</td>
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</tr>
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</table>

Union Station is Amtrak’s headquarters and the terminus of numerous U.S. North-eastern rail services, including the western hemisphere’s fastest train, The Acela Express. The station is the United States’ second busiest, handling 4,971,128 per annum (National Railroad Passenger Corporation 2017). The station’s central location near the U.S. Capitol places it at the nexus of the city’s spatial pressures and thus, Burnham Place aims to unlock the air rights above the rail yards to the north of the station.

Unlocking development rights has been a lengthy process, from Akridge’s preferred bid to acquire the air rights in 2002, to receiving ownership thereof in 2006, to the development of the initial Burnham Place design concept in 2012. Currently in the environmental impact study (EIS) phase, the Record of Decision and final EIS is due in 2018, after which the development can commence (Tuchmann & Dunmire 2016).

The project does not cover a significant area. It makes up for this with its high-profile location at Union Station, and offers complexity of use and urban interest in the 5.67 Ha (14 acre) site. It is
estimated 500 hotel rooms, 1,300 residential units, 9,290m² (100,000 sqft.) retail and 139,354m² (1.5-million sqft.) of office space will occupy the site. In addition, an above-rail public plaza will be located in a north-south configuration from a proposed H-Street Plaza to K-Street.

To the west of the site, a Greenway is proposed atop the Metro Red Line. This mimics the Highline’s, linear, above-grade, greenspace model in a way, but also forms a green terrace, step-wise raising the grade of the site from the natural ground level to the west of First Street NE, to above grade (atop the rail yard) to the east thereof (Akridge n.d.).

These developments work in concert with the redevelopment of Union Station beneath and adjacent to it. Accessibility, including ADA, capacity-constraints, congestion, and transit and urban integration of this multi-modal vision are cited as major motivators for the upgrade. This is a large, phased project costing up to $7.5bn in 2012-dollars, but touted to contribute $13.5bn to $15bn to the gross regional product over the fifteen to twenty year construction period. It is also projected that expenditures by arriving Amtrak passengers will increase by over 200% over this period.

Not only is it seen as a matter for city connectivity, it is seen as point of civic pride, as Union Station is numerous visitors’ first impression of the United States’ capital city. Thus, the new ‘train shed’ aims to impress, greeting visitors with improved natural light, multiple levels of train concourses and retail, capped with a ribbon shaped ceiling topped by a green roof in places, glass in others. This too, will naturally mitigate temperature extremes within the station (see Figs. 4.4.7.B & C) (Parsons Brinckerhoff & HOK 2012).
Figure 4.4.7.A: Burnham Place 2012 Masterplan (Akridge)

Figure 4.4.7.B: Train-Shed Exterior Rendering (Parsons Brinckerhoff & HOK)
Figure 4.2.7.C: Central concourse under the new Union Station 'train shed' (Parsons Brinckerhoff &)

Figure 4.2.7.C: Looking north along First Street NE and the Greenway, with the new air rights development (AKRIDGE/SBA)
TAKEAWAYS >>>

- It is possible for the private sector to be an instrument in rebuilding the urban fabric, by giving them the ownership, appropriate regulatory environment, and tools to do so.
- A grade change is not a deal-breaker in dealing with a disconnected urban fabric. Different design methods can be employed to mitigate this ‘step change.’
- The step-change along First Street NE does employ soft landscaping to decent effect, but lacks activated frontage and contains extensive impervious walls.
- Large-scale private investment does not preclude the creation of public space.
- The procurement, design, and EIS (EA) process is lengthy, and can sometimes span more than a decade.
- Design solutions that have worked, like the Highline, are being replicated worldwide.
- In an era of the reinvigoration of public-transit and rail travel in North America, we need to view our stations as we view airports: as ambassadorial to outsiders of the image of their host city.

DISCUSSION >>>

In Toronto, a design solution for linking Front Street to a reimagined Lake Shore Boulevard may require significant grade changes to surmount the CN railways. The elevation of the rail lines is a significant barrier, as it is almost in line with Front Street’s elevation, with Bay Street dropping in elevation to the south and tunneling beneath the rails, but remaining at this lower level onwards to Queens Quay. Thus, some of the design solutions employed by Burnham Place along First Street NE may provide inspiration.
However, a First Street NE inspired solution would be improved by making step-change walls pervious; this would involve potential store-front activation. Sloped landscaping would ameliorate a high wall’s deadening effect in places where active frontages cannot be achieved.

Union Station aims to look towards the city in how it architecturally speaks to train and rider. Train stations should be departing the era of looking inwards, as buildings functioning only for the purpose of the tracks, and not for the cities they serve. In this redesign, we see Union Station embracing its interaction with H-Street Plaza, channeling natural light, and reaching for the streets beyond its envelope. This mirrors much of what was done in Melbourne at Southern Cross Station.

Similarly, we can learn these lessons and transpose them onto Toronto between Bay and York Streets, bolstering the relationship between Front Street and the station to the south. As seen in Washington, DC, a similar rethink of Union Station Toronto could catalyze the rebuilding of the urban fabric between Front and Lake Shore.
4.3 | Design Conclusions from Case-Studies

Toronto is in a complicated position, more in common with some European examples, than North American ones. The corridor requiring a redesign or retrofit is located within a built-up area. This density is a more recent phenomenon, as aerial imagery clearly shows how land south of the CN Rail lines was almost exclusively laying ‘fallow’ until the mid-2000s. Thus, the design solution will need to contend with a complex milieu of over-the-rail grade changes, potential road diets and pedestrian treatments, and with existing buildings and building approvals.

Some Cape Town solutions have come to the fore that retain the Foreshore Freeways. What has been done, particularly in Proposal C, is the consolidation of traffic-bearing viaducts, and the green retrofitting of non-traffic-bearing ones. Residential buildings have also been proposed that interface with the most attractive pedestrian levels of the district, even if they are at ‘green viaduct’ level. The provision of this highline urban open space is an exercise in satisficing, with new development paying for the scheme (SkyscraperCity n.d.). Decking a rail line does not come cheap. In this case, Toronto can implement a similar scheme where the needs for inner-city open space is balanced with compensable highrise development. Also, the design will not attempt to completely hide all infrastructure, but rather use it and celebrate it, as is the case in Cape Town’s Proposal C.

Via Verde in Mexico City has shown Lake Shore Boulevard that the space beneath the Gardiner Expressway does not have to be a dead, bland space. The 141 Bay building proposal provides for a cycle lane and pedestrian improved space along its southern flank with Lake Shore. There is no reason that this cannot be continued east- and westward, with associated viaduct pillar urban-environmental and/or aesthetic treatments. Creating vertical interest using viaduct pillars will be suggested in the design. Learning from the home grown example at Underpass Park,
lighting will be key in ensuring night-time safety and attractiveness of this east-west artery. The proposed Metrolinx GO-Bus terminal at this location will add impetus to this intervention.

Seattle has been very aggressive in major infrastructural projects of late. This city, like Toronto, is experiencing an economic and population boom. However, it comes with a less risk-averse environment to expenditure on public projects, albeit these are backed by Federal grants in the United States. Some solutions presented here seem dreamlike for Toronto, like the complete tunneling of their elevated urban freeway, the Alaskan Way Viaduct. More realistic projects to emulate are the proposed Interstate-5 capping project and the completed Aubrey Davis Park over Interstate-90. Seattle is a city in need of urban open space. It lacks a major urban park, with their version of the Toronto Islands being Discovery Park, located 9.2 km (5.7 miles) to the north-east of downtown. Seattle is addressing this deficiency by sequestering the air above their infrastructure, viewing the ‘air’ above freeways as opportunities to create urban open space.

Toronto has a perceived lack of urban open space. It is not as chronic as is experienced by this Pacific Northwest city, but remains something of concern to residents and the city officials alike (TOcore 2017). Like Seattle, Toronto can ill afford land expropriation for parks. The only option, as seen in the Central Rail Deck Park (Blue Jays to Spadina) proposal, might be sequestering CN Rail air rights. This logic motivates the eastward extension of the rail cap for this design. Seattle has done the calculations and found that capping is cheaper than purchasing developable land.

Toronto’s Underpass Park and Auckland’s SEART Sylvia Park Shopping Centre make a real change to dull spaces at minimal cost. It is important to remember, these are not done in signature civic spaces. Underspending is not always the wisest option for long-term returns. This corridor has some of Canada’s most sought after real-estate. Failing to adequately address these spaces, for simple, short-term, budgetary miserliness, could easy leave the city and its residents
poorer in the very near future. Notwithstanding, a bit of color, some added lighting, and some urban artwork and amenity, can go a long way in more marginal spaces, perhaps in latter, less centrally located phases.

Birmingham’s HS2 plan for Curzon Station has displayed a high degree of forethought in anticipating growth, springing from a new seamless link to London. The station has not been viewed as a standalone transit amenity. It has been viewed as a catalyst for economic growth. Curzon is leveraged as a commuter and visitor gateway, a link to external markets and economies, and is positioned as the core of a huge transit-oriented development (TOD) in the heart of the city. The Curzon TOD is districted out, ensuring each urban-economic element has a place of prioritization within it.

Elevating Union Station to the power of its role and position within Toronto, is what the rail-cap design proposal is all about. Retaining the status quo of a spatially fractured station and rail line, is not living up to the potential of the site, nor is it serving the best interests of Torontonians. Rather than existing as a place to converge to simply leave the downtown area, Union Station and environs needs to become an integrated TOD where people converge, engage, and are economically and socially active. Curzon shows that stations and their urban precincts do not need to be places to simply board a train. It shows us that Toronto’s Union Station can be an economic, aesthetic, and landmark urban asset. Curzon is also reflected in the design in mixing functions within the proposed TOD through a diversity of land, park and building uses.

This feeds into the lessons taken from Millennium Park in Chicago, which has subsequently become the city’s signature urban open space. This idea has become the inspiration behind 1canada PLACE, or some incarnation thereof. Not only was Millennium Park built to enhance Chicago’s international profile and boost urban amenity for residents, it was done using a large
amount of private capital. While Toronto should refrain from shying away from capital expenditure that will reap long-term fiscal benefits, it too can monetize new developable land and public spaces. It must also ensure commoditizing certain park/built elements does not negatively affect the urban realm. Such endeavors must be done with great sensitivity and forethought. Through these lessons, 1canada PLACE and York-Rail Square can become Toronto’s Millennium Park incarnate.

Melbourne’s Federation Square and Southern Cross Station display some essential elements of station and streetscape integration, as well as elements of street grid congruence and pedestrian grade-change. All of these elements are essential to the rail-cap design around Union Station, with less emphasis on the streetscape integration; due to climatic differences with south-east Australia and existing historic façades of Union Station facing Front Street W. The architecture of Federation Square provides us with stark dos-and-don’ts. Cultural and national symbolism is evident in the architecture and landscape design, but sometimes the implementation thereof is too juxtaposed with the existing urban environment, or comes across as gaudy urban-appliqué. It is proposed Toronto’s architectural legacy be celebrated in merging the ultra-modern and Victorian city, without the pastiche element. Queen Street W. is an apt template for UnionTO development form and authentic Torontonian massing.

**Figure 4.3.A: Queen Street W. & Torontonian built-form**
Hudson Yards is the largest, single, urban development in North American history. It is remodeling west Manhattan’s skyline. Rail-capping in Toronto could also significantly alter the face of southern downtown. The developers of Hudson Yards would not be capping the West Side Yard if it was not profitable. This speaks to what could be achieved here, both in economic development potential and in tax windfall for the City of Toronto. Similar state and city windfalls are discussed in the 30th Street Station Precinct plans in Philadelphia.

Hudson Yards, at 11 Ha (28 acres), is remarkably similar in size to a future Toronto rail-cap from Blue Jays Way to Yonge Street at 10.6 Ha (26 acres). With built structures occupying only 38% of this $20bn project, atop the West Side Yard, a Torontonian solution would easily be able to balance profitable air-rights development with the provision of new urban open space. The bulk of the Toronto project would be dedicated as urban open space, pedestrian and cycle paths, and landscaped plazas and parks.

The 30th Street Station Precinct makes impressive assertions around its economic spin-offs, although none of these are temporally linked. This Philadelphia redevelopment also prioritizes the provision of urban open space and public amenity around 30th Street Station. The design also does so without completely hiding (capping) all the freeway and road infrastructure. Union Station, and its historic context of being the hub of Canada’s railways, should be celebrated, not hidden. Sometimes infrastructure is not pretty, but at other times, this industrial-functionalism can be enthralling. In the case of Toronto, the rail and station elements should not be completely hidden. Elements of rail should be daylighted and/or given access to light, with people on the plazas above, given visual access to rail below. The design should provide the site and its public spaces with a sense of place, ensuring awareness that their reason for standing atop here is CN Rail. A design should also ensure those alighting from VIA, GO and UP-Express trains not only
know, but can feel and see they are in downtown Toronto. The design will also utilize the existing steel platform arches in York-Rail Square as industrial-aesthetic elements, celebrating the age-of-rail.

The biggest problem facing a redesign of the space surround Union Station is the grade change required over the rails. Burnham Place in Washington, DC provides clues to what is possible. However, the DC design lacks wall-activation along most of the terraced and grade-changing spaces. This may likely deaden grade transitions for pedestrians. In Toronto, activating the grade-changes may prove difficult, like along the Sony Centre and along Union Station, as existing and/or historic structures disallow major façade modification. This can be ameliorated, through the provision of an attractive public-realm and/or retail and dining opportunities. This is what is proposed for in the design in grade-change-following structures of the Sony Centre Creative Cube, Sony Centre South Annex and South Union-Maple Leaf Square Deck. In these places, ‘urban carrots’ are placed at strategic
points to ensure those on foot are attracted to that which awaits up-slope. A clear example of this terrace and grade-change activation is evident at Rive Gauche in south-east Paris (see Fig. 4.3.C). This tactic will be employed in places, particularly at Yonge Street Transitions.
5 | Toronto Situation

5.1 | Canada’s Financial Heart

Toronto does not have a long history of global impact, regional influence, glamorous urbanism, or phenomenal growth. For much of its history, Toronto and Upper Canada played in the lower-tier of the urban leagues. Lower Canada and Montréal had ascendancy up until the 1960s. Both cities saw their fates tied to fur trading for much of their formative years and to the then powerful Hudson Bay Company. As the 19th century continued, the economies of both centers began to diversify. Toronto was beginning to reap the benefits of its socio-political and geographical position from the 20th century (Relph 2014, 1-11).

Proximity to the growing economic and manufacturing centers of the United States helped to grow Toronto’s own industrial sector. The city, located further west as compared to Lower Canada (Québec), was also leveraging its better position to benefit from Canada’s westward growth towards the prairies and west coast, after the railway reached Vancouver in 1885. Manufacturing and resource sectors began to shift in the middle of the 20th Century with the decline of the secondary economy in OECD nations. What may have finally tipped the scales against Montréal in favor of Toronto was the political storm brewing in Québec and the fears of Anglophone domination. As separatism amongst Francophones came to a head in the late-1960s, corporations left the province of Québec in droves for Toronto; their fear of a fractured Canada, left the economy of Montréal sputtering (Hadekel 2015).

This strange urban devolution and evolution has left its mark on Toronto. It is easy to see to the trained eye, simply by walking the streets of the city. One notices an ultramodern high-rise
overlay atop a Victorian low-rise fabric. Buildings seldom are of mid-height, as one might see in numerous turn-of-the-century neighborhoods in Chicago or New York. Toronto’s buildings either stretch skywards or hug the streets in a genteel manner at a two- to three-story height. The mid-years of rapid growth simply passed Toronto by, leaving the city as a poorer stepchild to grander cities across the border, even to Montréal further east. This changed rapidly in the latter years of the 20th century and early 2000s. These recent successes have been an economic boon, but have also beset the city with some critical issues.

Toronto’s public-transit system has failed to keep pace with growth. While boasting North America’s most extensive streetcar network, the harsh winters and high shared-street traffic volumes impact efficacy. Subterranean transit lines can be predicted by observing average building density. Dense corridors stretch outwards along TTC-Subway lines from downtown in tendrils of high-rises to the horizon.

However, this middle-aged growth deficiency produced something interesting when coupled with Canada’s lack of widespread blockbusting, red-lining, and overt racially-charged urban renewal practices seen south of the border: the inner-city never emptied out (Sewell 1993, pg.x). Suburbanization has certainly occurred. Locally, suburbanization was heralded by the
construction of, and modelled around, the Don Mills neighborhood. However, the ‘White-flight’ phenomenon did not happen here. In the 1970s when cities south of the border were seeing mass capital flight to the suburbs, Toronto saw an inner-city neighborhood resurgence. The ‘creative class’ urban revolution happened decades earlier in Toronto (Sewell 1993, 174-177).

Modernism as a planning ideology made its presence felt in developments such as Regent Park in 1947, where Toronto’s old grid made way for tower-in-the-park styled superblocks. While there was a local phase of creating modernist superblocks and urban renewal, fashioned in the American-style of demolition and rebuilding, the process was halted comparatively sooner.

Modernist redevelopment was finally brought to an end by the successful, mixed-use redevelopment of an industrial brownfield site south east of the city. The St. Lawrence redevelopment was a great success, as the development turned buildings towards a strengthened urban street fabric and mixed commercial and residential uses, typical of traditional neighborhoods. It was remarked that it felt as if the neighborhood was always there, owing in part to the neo-traditional style that blended with the existing architectural aesthetic. St. Lawrence heralded the end of ideological wholesale demolition and redevelopment of city neighborhoods (Sewell 1993, 191-198).

Toronto suburbanized without emptying out. The suburbs were ascendant for decades, but the process of extreme exurban development was curtailed. Don Mills was to become a powerful and ubiquitous suburban developer template. Although not the first planned neighborhood in Canada, its looped street-fabric departure from the older grid was adopted by Canadian developers henceforth. This template, coupled with local government control, resulted in a denser and more contiguous method of suburban development when compared to leap-frog development common in the United States (Relph 2014, 47-48).
Runaway suburbanization has been tempered through policy and land-use control, meaning that even though sprawl has become a major issue for Toronto, the effects experienced are not as acute as in many American cities. In Toronto, urban development, despite overtly de-densified, still remains contiguous.

A contiguous urban development strategy for the Golden Horseshoe was finally codified in the creation of the expanded 217K Ha (535,000 acre) Oak Ridge Moraine and Niagara Escarpment Greenbelt in 2001. It aimed to halt urban expansion and protect the natural heritage of the Golden Horseshoe. The liberal provincial government under Premier Dalton McGuinty expanded the greenbelt in 2005 to become the world’s largest, at 7,300 km² (1.8-million acres) (Relph 2014, 151-153; Reeves 2015).

Urban expansion restrictions means pressure is shifted to the city to find more effective and denser land-use types, as development effectively has a spatial growth cap. This places more impetus on the lakeshore to house a growing number of people seeking to live close to the city.
The Greater Toronto and Hamilton Area is extremely polycentric today. It is continuously urban from Hamilton in the south-west to beyond Oshawa in the east. Urban nodes of huge significance exist throughout the Golden Horseshoe region, but were not prominent until after 1960. Some were old cities that exploded in the suburban boom, like Hamilton and Oshawa. Some are burgeoning old towns, like Burlington, Richmond Hill, and Brampton; others are brand new town centers and cities, like Mississauga and Markham.
Developing polycentricity has reduced the overwhelming importance downtown Toronto exerted over the region pre-1960, resulting in a city system of numerous ‘bodies’ having a strong gravitational pull, but with downtown remaining the largest ‘body’ in the center - the Sun of the metropolitan region if you will. All bodies exert a strong influence on their immediate urban surroundings and function with some spatial and economic autonomy. Still, the center of Toronto maintains a hegemonic presence, albeit with a slightly weaker comparative gravity. Local needs, such as community amenities, shopping centers, government services, and even employment opportunities, are now decentralized. However, cultural, sports, and major government institutions remain downtown, alongside most corporate offices. Therefore, this hegemony appears unlikely to change in the near future. Additionally, the density to create true urban neighborhoods with mixed zoning and well-functioning public-transit currently only exists there (Relph 2014, 105-110).
5.2 | History of Lakeshore & Freeway Divisions

Figure 1: Change in Toronto Harbour 1898 to 2017 | Rand McNally & CCCMaps
Toronto has a history of continuous alteration and reclamation of the lakeshore. The Toronto Islands, in the founding days of York, as it was originally named, started off as a westward opening spit linked to the mainland, where the Port Lands are located today. The Don River mouthed out into the head of the bay formed by the spit.

The spit was eventually split from Ashbridge’s Bay by a storm in 1858 forming Toronto Island. It was kept from reforming a peninsular spit artificially, easing shipping access to the harbor and forming the permanent Eastern Channel. Today, Ashbridge’s Bay has been reduced to the Keating Channel in the Port Lands in the west, and small recreational harbor off to the east at Woodbine Beach (Rotsztain 2016).

From the turn of the century until 1928, the immediate shoreline was pushed southward from the CN Rail lines into Toronto Harbour. Industrial demand for wharf side space expanded it to beyond Queens Quay, creating a continuous wharf with berths of at least seven meters. Streets on the historic lakeshore retain names such as Front, Esplanade and Harbour (Ellison 2013).
All subsequent development south of the Fairmont Hotel and Union Station is non-historic in nature, and often took decades to fill the reclaimed land. Historic photography shows how the bulk of this reclaimed land was given over to industrial and port activities, mostly occupied by marshalling yards, warehousing, wharves, and dock side structures.

Automobile ownership grew exponentially in the earlier part of the 20th century, heralded by the opening of Queen Elizabeth Way (QEW), a ground breaking limited-access highway built in 1939. It linked Greater Toronto to the U.S. border near Niagara, and was North America’s first intercity freeway (Relph 2014, 114). The Gardiner Expressway into central Toronto was a later extension thereof, conceived by Frederick Gardiner, Chair of the Metropolitan Executive Committee, in
1953. Construction commenced by 1955 and was built in phases. The expressway initially opened in the west at the Humber River, culminating with the construction of the Don Valley Parkway to Leslie Street extension in 1966. Frederick Gardiner’s original vision was to extend the expressway eastward all the way to Woodbine Ave. The Don Valley Parkway saw its completion at around the same time (Kane 2014).

The 401, which forms a critical backbone of the metropolitan freeway network, is claimed to be the busiest limited-access highway on the continent. The route was designated, in part, in 1952, at a time when the 400-Series of Ontario freeways were being constructed. It was completed in 1968 in its current limited-access configuration, from Windsor (ON-Rte.3) to the Québec border (Autoroute-20) (Bevers 2002).

Few central neighborhoods were razed in the city for the sake of a freeway up until the late-1960s. However, within the Crosstown and Spadina Expressway plans, many neighborhoods would have been razed and masses of people could have been displaced. The Spadina Expressway could have torn though Chinatown, The Annex, Forest Hill, Harbord Village, and Kensington Market. This was not to be:

“Cities were built for people and not cars. If we are building a transportation system to serve the automobile, the Spadina Expressway would be a good place to start. But if we are building a transportation system to serve people, the Spadina Expressway is a good place to stop.”

With these words in 1971, the Ontario Premier William Davis, halted expressway expansion in Toronto and gave the win to ‘Stop Spadina and Save Our City’, the movement given credence by the late Jane Jacobs (Bow 2005, 148-149). Since then, the Golden Horseshoe has seen the ON-407 | ETR constructed as a de facto outer beltway, but no further city freeway construction has taken place near central Toronto.
5.3 | Transportation Effects Today

To fully understand the constraints of the site and grasp the implications upon the Toronto of today, we cannot ignore the automobile. The 401 has overwhelmingly become the main traffic artery in the region, despite coming nowhere near downtown. The downtown-bound, loop-shaped, Don Valley and Gardiner Expressways, whilst viewed as of critical importance to Toronto’s functioning by suburbanites, have an anomalous traffic volume pattern when examined closely, in light of the metropole’s greater polycentricity. (Tahair & Bowen 2016; Transportation Services Traffic Safety Unit 2013).

With traffic, a strangely different pattern emerges as mentioned before. Traffic volumes on some major expressways actually diminish near downtown. See below for a numerical description of this anomaly.

The 2013 inbound data clearly shows a drop in traffic volume as one approaches the downtown, with outbound traffic closely following the trend. Traffic is on its way somewhere but, for the most part, it is not through downtown. The inbound traffic volumes decrease with each consecutive off-ramp, as one approaches downtown. The majority of vehicle trips on the Don Valley Parkway and Gardiner Expressway are destined for downtown, with well over half of the vehicles not continuing on the freeways through downtown. The intense suburbanite argument against demolition of the Gardiner’s mid-section is clearly based off conjecture and/or opinion and not data.
### Don Valley Parkway (southbound)

<table>
<thead>
<tr>
<th>Location</th>
<th>Traffic Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. @ The 401</td>
<td>93,358</td>
</tr>
<tr>
<td>2. @ Don Mills Rd.</td>
<td>70,861</td>
</tr>
<tr>
<td>3. @ Lake Shore/Gardiner Exwy.</td>
<td>35,520</td>
</tr>
</tbody>
</table>

### Gardiner Expressway (eastbound)

<table>
<thead>
<tr>
<th>Location</th>
<th>Traffic Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. @ The 427/QEW</td>
<td>112,980</td>
</tr>
<tr>
<td>5. @ Dunn Ave to Strachan Ave</td>
<td>81,048</td>
</tr>
<tr>
<td>6. @ York St. to Yonge St.</td>
<td>46,370</td>
</tr>
</tbody>
</table>

(Transportation Services Traffic Safety Unit 2013)
These two conflicting facts surrounding transportation are going to have an effect in what solutions can be proposed for the lakeshore downtown site, and how much we can tweak the road infrastructure.

Lake Shore Boulevard presents a complicated problem, as despite the Gardiner Expressway displaying a downward trend in traffic volume to downtown, Lake Shore seems to be where a lot of this traffic ends up. On 21 April 2009, Lake Shore Boulevard West carried 69,990 vehicles per day at the Spadina Avenue intersection. Despite carrying just under half the Gardiner’s 63,854 (eastbound) and 62,720 (westbound) automobiles, still being a significant volume for an at-grade boulevard (Transportation Services Traffic Safety Unit 2013; Eastwood & City of Toronto 2012).

Traffic volume presents a potential design blockage to integrating Lake Shore Boulevard into the lakefront urban fabric, whilst not causing traffic chaos, due to pedestrian-friendly design interventions. To prove workable solutions are viable, one can turn to other busy intersections in Toronto that support a pedestrian-friendly urban environment. An example of such an intersection, with traffic counts that exceed the remaining Lake Shore Boulevard counts, is

![Gardiner Expressway from the CN Tower looking east to the Port Lands (Andres de Wet)](image-url)
University Avenue and Dundas Street West, with 51,628 vehicles and 43,220 pedestrians at a 2010 count. Another high-profile location in Yorkville is Avenue Street and Bloor Street West, with 67,758 vehicles and 37,744 pedestrians, in a 2008 count (Eastwood & City of Toronto 2012). Clearly, the city displays precedents of people and cars coexisting.

Thus, we can link downtown and the lakefront over Lake Shore Boulevard, coupled with CN Rail pedestrian interventions. Obviously, this will require some creative urban design, as the Gardiner viaduct structure presents an additional restraint on design. Additionally, the most effective catalytic intervention would be at Bay Street, as it already carries the bulk of pedestrian traffic between the two urban precincts. At the eastbound and westbound Bay Street intersections of Lake Shore, counts varied between 13,670 and 15,552 pedestrian counts over a twenty-four hour
period in 2009. This count has almost certainly grown with the burgeoning construction of lakefront residential high-rises, as well as the much used Queens Quay upgrades.

Using anecdotal but clearly observed evidence, the Rees Street intersection is also a place requiring intervention. After a Blue Jays game at Rogers Centre, the intersection is choked with pedestrians desperately trying to make their way across pedestrian-unfriendly Lake Shore Boulevard to the Harbourfront Centre and Queens Quay (See Fig. 5.3.C) (Observation: Andres de Wet 11/09/2016). On event days, this intersection is woefully insufficient for the needs of those on foot, and for the crowd management needs of Rogers Centre. The same will ring true for the Air Canada Centre on Bay Street.

Within this design study, the resources required to intricately deal with the automobile disconnect may not be forthcoming. However, noting these factors are important for Further
Research (Section 7.3), have influenced interim design recommendations (Section 6.3.6), and have had an impact on 141 Bay’s landscape design plans for Lake Shore Boulevard.

Complementing the automobile-oriented road network, Toronto has a decent public-transit network, at least within a North American context. The city has the most extensive streetcar network on the continent. A major drawback is that only a few lines have dedicated lanes and median stations, often impacting the efficacy of the network. The safety of alighting passengers into middle lanes of traffic has also been a concern. In addition, given the long history of frugal public spending, the TCT-Subway system has failed to expand much in the period post 1970s to the early 2000s. The Sheppard Line has been the lone, major subway development; today, it is TCT’s least-used service, located in a low-density, suburban part of the metro. More recently, the Yonge-University extension was funded by the federal government, Metrolinx, City of
Toronto, and the Regional Municipality of York; it will extend from Downsview to Vaughan in late-2017 (TTC 2016). The Eglington Crosstown Line, a new east-west light-rail line, is touted to open in 2021 and will be the longest TTC expansion in decades (Metrolinx 2017).

The suburban focus of expansion highlights the lack of public-transit investment focused on the core of Greater Toronto. While urban development has become heavily deconcentrated, it does not negate the need for more downtown connectivity. Downtown transit capacity is finally getting some attention with the TTC Relief Line studies.

![TTC Streetcar Network in 2010](image)

**Figure 5.3.E: TTC Streetcar Network in 2010 (Mackenzie 2010)**

The rail infrastructure is not really adjustable, as CN, VIA, and GO are not malleable in their needs. The other constraint is that the Gardiner Expressway is, more than likely, here to stay for
the foreseeable future. As a result, the infrastructural question’s primary focus is on at-grade Lake Shore Boulevard.

CN Rail is a structural issue and the actual transit usage data does not necessarily have an impact on how the railways can be surmounted as a pedestrian barrier. We accept the rail alignment cannot be altered, regardless of ridership numbers. In fact, the higher the ridership, the more proposed interventions will be used by foot traffic. It is more important to note how many riders alight and exit on foot from Union Station onto Front Street: 34,230 per day at Bay Street, and 48,112 at York and University, with both counts made in 2009 (Eastwood & City of Toronto 2012). It is claimed 200,000 people pass through Union Station on most business days (City of Toronto n.d.)

5.4 | The Socio-political Climate

It has been claimed that Toronto has long been a progressive city and a bastion during tough times, like during the Vietnam War. During a period of upheaval south of the border, conservatism kept the city intact. Mega-mall and out-of-control sprawl development, coupled with disinvestment in public-transit, did not happen here. It is claimed a charismatic city leadership and a robust and well-informed middle-class helped steer Toronto. It seemed to be a haven of personal freedom and enclave from global political storms (Boudreau, Kiel & Young 2009, 39-40) Toronto eventually succumbed to the neoliberal ideology. Today the hangover persists, and many decisions comes down to dollars and cents, with a good dose of ‘what can
the private sector contribute.’ The days of large capital projects sole funded by the city are largely over. The City of Toronto operates within a limited fund-raising (tax) mandate, and few avenues exist outside of property rates and taxes to boost the city’s treasury. The absolute aversion to capital expenditure may change somewhat under Mayor John Tory.

Infrastructural lag has become problematic for the city, ranked number-9 amongst North American cities in the TomTom Traffic Index (The Business Journals 2016). An inability of Torontonians to get around has become an issue in retaining talent in the city; people are beginning to cite it as a reason for not remaining. This, coupled with a city that hasn’t built a major city expressway since 1971 and where public-transit investment has been lacking, has meant things have progressively become more and more congested and TTC lines oversubscribed (The Economist 2017).

The previous Rob Ford administration was seen as particularly averse to any major public-transportation investments. This led to a policy position that aimed to never anger the motoring
public (The Economist 2017). Political change has set the city up for a comparatively ‘more transit friendly’ administration under Mayor John Tory.

The SmartTrack commuter rail link has been proposed, building upon the GO Regional Express Rail. This will improve service, reduce ridership fees, and capitalize on existing infrastructure, with a particular focus on relieving the TTC Yonge-Bloor Lines. This project was a large part of the current mayor’s electoral campaign (City of Toronto | City Manager’s Office 2017; The Economist 2017).

Mayor Tory has officially proposed a $1.50 (CA$2.00) toll on the Don Valley Parkway and Gardiner Expressway. He claimed motorists need to pay their fair share and the City of Toronto and its tax-payers can no longer subsidize commuters from The 905 (suburban GTA area-code); the city has to reinvest in transit or face a worsening connectivity crisis. He also claimed the projected $149m (CA$200m) annual income would be ring-fenced into an Infrastructure Fund, along with the recently approved 0.5% rates surcharge. This fund will be used primarily for the big items, SmartTrack, Downtown Relief Line and Waterfront LRT. Despite tolling being refuted by the Ontario Provincial Government, this proposal displays policy position and intent at the city. (Lupton & Janis, 2016).

Seeking a user-pays funding model marks a tremendous policy shift in council, departing from the long-held North American convention of subsidizing the behavior of automobile owners at the expense of the general revenue and reinvestment in other transit modes. Aforementioned policy shifts could mark an era when GTA motorists may be forced to actually pay for auto-
oriented externalities (Gutfreund 2004, 46-58). This policy is clearly not popular with suburban residents in The 905, with councilors trumpeting the negative impacts for their constituents.

Torontonian history has not been kind to bold transit changes and capital funding methods. It is asserted that three issues of governance plague Toronto. Firstly, the weak-mayor system in the city that lacks a true party system. Secondly, the multi-organizational responsibility of transit between the city, Metrolinx and Ontario itself. Thirdly, federal funding is not well-channeled into needed projects, and is rather poorly appointed to ‘silly projects’ (The Economist 2017).

Attitudes within the Province of Ontario do appear to be changing and there is a greater realization in the province that connectivity of the metropole is critical to the economy, regionally and nationally. This seen in the provincial pledge to spend $119.4bn (CA$160bn) over twelve years on public investments, many of which involve transportation (Ministry of Transportation 2016).

With thirty-three percent of all city employment located within downtown, subway lines are overburdened during rush-hour. The Relief Line is under investigation until 2017, and proposes a u-shaped line from Pape station on the Bloor-Danforth Line, through Queen and Osgoode stations along the Yonge-University Line (phase one), back up to Bloor-Danforth, somewhere in the vicinity of Dundas West (phase two). The Relief Line cannot come soon enough, as at current levels of ridership growth, TTC capacity will be exceeded by 2031, even with smart signaling (City of Toronto and TTC 2017).
These projects are in the study-area’s backyard and often, constitute the spatial bookends. To the east, the Gardiner Expressway is being retained, but realigned. To the west, The Bentway sees a public space being created beneath the viaducts beyond Spadina Avenue. The sole rail related project, being the Toronto Railway Central Park, still in its conceptual phases, proposes to cap the CN Rails ‘Millennium Park-style’ east of the Rogers Centre. Considering these projects are in either their implementation phases, or are approved, integrating them into the proposed downtown design intervention is critical.
5.5.1 | Gardiner East & Lower Don Lands | Option 3 Approved

The decision has been taken to realign the eastern sections of the Gardiner Expressway from Parliament Street to the Don Valley Parkway. The decision is a culmination of a few council decisions. Number one in 2015, was the narrow city council defeat of the ‘tear down’ option for the Gardiner Expressway. The second was an election promise by John Tory to retain the infrastructure, with number three being the decision that something has to be done, as the Gardiner is beyond its engineered lifespan. Hybrid Option 3 was commended by Mayor Tory, but derided by opponents as the ‘best of the worst options’ (Pagliaro & Powell 2016).

The East Gardiner Realignment marks the eastern boundary of the study area. The EA (environmental assessment) document admits to many of the constraints discussed within this document: the gap in the urban

FIGURE 5.5.B: EAST GARDINER REALIGNMENT | HYBRID OPTION 3 (DILLON CONSULTING LTD. ET. AL.)
fabric the railways, Lake Shore Boulevard, and Gardiner Expressway create; the eyesore that is the viaduct; the unpleasant urban environment; and the impediment to pedestrian movement.

The EA should serve as an outline for the direction Toronto wishes to take in this adjacent, but very similar area, and these urban design goals should be closely followed. The East Gardiner EA outlies the following intended outcomes of the project:

- Prioritize urban design excellence, place-making, and quality of life as integral components of project design and evaluation;
- Contribute to the creation of the waterfront as a regional/tourist destination;
- Rejuvenate the underutilized and derelict lands under and adjacent to the expressway;
- Balance provision of new amenities for both local and regional users recognizing that local and regional stakeholders may value amenities and infrastructure in different ways;
- Build on existing planning initiatives and conclusions. The EA study will coordinate and seek opportunities of mutual benefit with those initiatives; and,
- Acknowledge this project as an opportunity for city-building. Evaluate city-building investments, outcomes, and benefits in local, regional and global contexts. (Dillon Consulting Ltd et. al. 2016, 30-31)

Despite being the most expensive of the three proposals at a capital outlay cost of $425m (CA$569m in 2016), Hybrid Option 3 was declared the preferred option by the EA, and by city council, in 2016. It was clear that this option that opens up the lakefront, and increases east-west urban-fabric connectivity between downtown and the lower Don Lands was preferred. This, coupled with the land value increases it generates. Hybrid Option 3 has a total land sale value to the city (not including knock-on rates and tax effects) of $54m - $62m (CA$72m - CA$83m), this compared to Option 1 coming in at median of $34m (CA$45m). There is a massive value difference if all development is separated by a ‘wall’ of Gardiner viaduct from the water’s edge (Dillon Consulting Ltd et. al. 2016, 335-337).
Hybrid Option 3 also sees the Gardiner Expressway straightened and moved to the north, aligning more closely with CN Rail. This also moves the Don Valley Parkway ramps northward. Lake Shore Boulevard West is given a more northerly alignment as well, from Cherry Street to the Don Roadway. This opens up more of the water’s edge on the Keating Channel, and eases the tightness of the s-bend in the current roadway. These road changes aligns this area more closely with the Keating Channel and Villiers Island plans, as commissioned by the Port Lands Acceleration Initiative and Waterfront Toronto. This improves the general walkability and waterfront connectivity from the Port Lands through to Queens Quay ((Dillon Consulting Ltd et. al. 2016, 141 & 298).

Some urban planning critics in Toronto, including within some publications such as The Globe and Mail, have claimed the East Gardiner Realignment is a huge waste of money (Bozikovic 2015). This can be attributed to the earlier inference to the ideological differences of urbanites
and suburbanites. Also, it can be attributed to the lack of major change envisioned in the design, with some real-estate being gained on the waterfront, for moving the Gardiner a mere 160m (540-ft) north.

### 5.5.2 | The Bentway | Under the Gardiner

This project aims to reclaim the space underneath the 5-storey high Gardiner Expressway viaduct. It is located just to the west of the city, on what is claimed to be the location of Toronto’s founding site at Fort York. It also closely follows the historic shoreline of Lake Ontario, once of significance to the First Nations as a gathering place. It will stretch 1.75 km from Strachan Avenue to Spadina Avenue.

The Bentway aims to provide a public space and trail that links up-and-coming inner-city neighborhoods with one another, and with urban amenities to the east, like Rogers Centre and Harbourfront Centre. These neighborhoods house 70,000 residents who will directly benefit from the new public-space. It is intended to be a year-round space that is multi-programmed, the
official site listing the following: *gardens, a skating rink, recreational amenities, public markets, public art, special exhibitions, festivals, theatre, and musical performances* (The Bentway 2016).

The project is supported by a philanthropic $18.7m (CA$25m) donation by Wil and Judy Matthews, working in tandem with Waterfront Toronto. The process of implementation is expected to be quick, projecting completion by July 2017. The freeway viaduct is to be leveraged as an artificial canopy, with the pillars and bridge sections providing the bare bones of the proposed outdoor rooms. Fort York and its history is to be celebrated with a new visitor’s center.

Judy Matthews, a retired planner, identified the western edge of the city as a place of growth, lacking in public amenity. The Gardiner’s fifty-five, fifteen meter high, bents (u-shaped concrete spans and pillars) provided an unused space with a “monumental quality,” ripe for repurpose. The city has $108m (CA$145m) plans to rehabilitate the western Gardiner Expressway, which could be undertaken concurrently with The Bentway implementation (Bozikovic 2015).

**Figure 5.5.E: Grand staircase at Strachan Ave, looking down The Bentway (Public Work via The Globe and Mail)**
5.5.3 | Toronto Central Rail Deck Park

An ambitious project to cap the CN Rail lines west of Rogers Centre is undergoing a $1.79m (CA$2.4m) study at the behest of the City of Toronto’s council (as of October 2016). The project is projected to create 8.5 Ha (21 acres) of parkland from Bathurst Street to Blue Jays Way. However, it still remains to be seen what air rights acquisition from CN (Canadian National) and TTR (Toronto Terminals Railway) will cost. GO-rail also factors into the equation as they plan the overhead electrification of tracks – new capping structures could not impede this.

It is projected to cost $746m (CA$1bn), although with similar projects having a history of huge cost overruns, some Toronto councilors are skeptical of this initial cost estimate. Jennifer Keesmat (Toronto chief planner) has pushed the idea as a matter of necessity. With a burgeoning downtown population, urban open space is chronically scarce. For the projected growth from
the current 200,000 downtown residents, to 475,000 in 2041, the city would need to allocate 256 Ha (633 acres) of park space to keep up with median levels in the rest of the city.

It is unclear how the project would be funded at this point. Some ideas being bandied about include private donors, like those who have helped with The Bentway and Chicago’s Millennium Park; another idea includes leveraging development-funds granting density and height rights. There are already forty condominium tower applications pending in the area. Pundits state that if such a project is not brought to fruition, the city may not be able to sustain increased residential density and this may be the city’s last chance to forge a larger inner-city green space (Pagliaro 2016; CTV News 2016).
6 | Design Solutions

6.1 | Revisiting the Questions

- How much of a barrier to ‘pedestrian at-grade movement’ does each element of infrastructure pose?

  - The Gardiner Expressway is not as much of a barrier as previously thought. The average 5-storey clearance underneath the viaduct means you pass under it with little thought, other than a brief shadow. The structure is unsightly and not in a state of good repair, but it’s not a hindrance per se; Lake Shore Boulevard is. It is large in cross-section, busy, noisy, traffic engineering and signalization favors vehicles, and it makes for an auto-oriented streetscape. The CN rail to the north poses the most foreboding barrier and deserves the most focus herein. The tunnels beneath the rails are dark and uninviting, creating an atmosphere of uneasy isolation as an unwitting invitee to a car-dominated, dark roadway. The Teamways are a good idea in theory, but lack proper activation and remain bland corridors between glass doors at each end. The CN rail disconnect will need an innovative and bold idea to make the link work.

- How can established rail infrastructure, cutting straight through an urban fabric, be retrofitted and reimagined through design interventions, such that the urban fabric can be sewn back together?

  - Using the case-studies, a few conclusions can be made. The first is that capping rail infrastructure is not inexpensive. To use the capping or lid solution, various parties, including private and public sectors, will need to
pool resources to make it happen. In larger cities with massive private-sector investment, like New York, they may take the initiative to cap rail infrastructure for developable land gains. What remains to be seen is whether lid-parks and cap designs can be modular, allowing for a phased and less capital intensive roll-out.

- The elevated freeway (*Gardiner Expressway*) is here to stay: what interventions can turn it from a liability into an infrastructural asset of redesigned ingenuity?

- Underpass Park, The Bentway, A8ernA (Koog-aan-de-Zaan) and Via Verde provide some guidance and design ideas. Now that the Gardiner Expressway appears to be here to stay, albeit requiring immediate repair work, the opportunity of being able to merge engineering and design into a form-and-function marriage, presents itself. Also, lighting may end up being key here. Adding an environmental element to the design needs to be well thought out: would adding Via Verde-styled elements be greenwashing, or would it add to the overall design in a meaningful manner? Within the interim design recommendations (Section 6.3.6), attempts will be made to ameliorate some of these issues, using quick-wins to achieve pedestrian gains and a positive developer response to the streetscape interface.

- What interventions of at-grade arterials (*Lake Shore Boulevard*) will facilitate greater ease-of-access between downtown and the lakeshore?

- Lake Shore Boulevard will ultimately need a significant cross-sectional redesign. It does not behave like an inner-city thoroughfare; it is designed as an arterial road. It has to be redesigned as a road suitable to its inner-city...
location. Given that the Gardiner Expressway is being kept, along this very alignment, through traffic can be more efficiently accommodated on the elevated Gardiner above using lane-reversal methods. This allows for at-grade Lake Shore Boulevard to become shared city thoroughfare. Therefore, pending a future traffic study, road diets and streetscape improvement are recommended, along with Gardiner on/off-ramp rationalization.

- How can cross-cutting corridors (Yonge, York, Bay and Jarvis) be improved to facilitate this improved access?

  - Pedestrian movement design convention states keeping people at ground level is most desirable. The grade and structure of CN rail will make this impossible. Southern Cross Station has some design solutions for creating a new at-grade level located above rail and the actual ground level. This opens up some design opportunities. The issue may end up being more how to ensure the activation of these transitions onto rail-deck conduits, rather than the creation of the conduits themselves. Bay Street, according to the pedestrian data, is the most critical north-south link and needs careful transitioning. Yonge, York and Lower Simcoe will also need cautious consideration, ensuring the grade-change feels either natural, or is in the least, extremely enticing.

- Could design solutions help in the provision of urban open space and green infrastructure, and if so, what do these entail?

  - Hudson Yards, Millennium Park, Federation Square, and even Toronto’s own lid-park proposal provide some insights into what is possible. Whilst Bay and Union may seem like the nodal points for activity in this area, the built-
structures and width of track may preclude uninterrupted green-space design. Ripley’s, Rogers, the CN Tower, and Metro Toronto Convention Centre provide the next impetus to the west. This is the logical place where a more significant public-realm intervention could take place. Activity is evident to the north and south of the CN rails, the middle needs integration to create a cohesive entertainment and conferencing precinct (pending convention center remaining/moving). This too, could link to Blue Jay Way and the proposed lid-park to the west.

- **What is the most significant takeaway from each case-study?**
  - The Foreshore Freeways (Cape Town, South Africa) provides the best metrics for design inclusivity and economic spin-offs for citizens. It also contains numerous elements taking the visual and climatic environment into consideration.
  - Via Verde (Mexico City, Mexico) aids in environmental retrofit design.
  - A8ernA (Koog aan de Zaan, Netherlands) is pivotal for community amenity and for hardscape treatments.
  - Underpass Park (Toronto, ON) provides a local case for viaduct ‘ceiling’ redesign and the use of urban-art and lighting elements.
  - Curzon (Birmingham, U.K.) grants insights into the theming of TOD precincts and leveraging connectivity for development success.
  - Millennium Park (Chicago, IL) shows how through partnerships, the private sector can be co-opted to share the capital burden in the creation of a signature urban open space.
- Federation Square and Southern Cross Station (Melbourne, Australia) shows expertise at bridging rail lines, leveraging clever station design and porous edges to merge the public realm with transit infrastructure.

- Hudson Yards (New York, NY) displays interesting green infrastructure, energy, and refuse technology integration. It is also a study in the complexity in what underlies a site and the systems that interlink it all.

- Jardin Atlantique (Paris, France) articulates the history behind capping structures and displays strong design symbolism.

- Sylvia-SEART Park’s (Auckland, New Zealand) design displays a strong use of color and simple design elements that cost-consciously transform a privatized space.

- Lid Parks (Seattle, WA) are helping this city cope with their inner-city, green space deficit. Its design solutions focus on gaining public space by occupying the air above infrastructure and has articulated the cost-benefits of doing so, in a city with spiraling land acquisition costs.

- The 30th Street Precinct (Philadelphia, PA) emulate the Hudson Yards model of rail-capping, but articulate user-groups and their needs best. The development does not deny the infrastructure beneath it, often actually flaunting it by daylighting strategic parts.

- Burnham Place at Union Station (Washington, DC) is another study on how to work with changing perceived ground levels and negotiating those grade changes. It also packs a tremendous amount of development into a small mixed-use site, using partnerships of public and private development entities. The proposed train-shed is an engineering and architectural feat.
6.2 | Design Brief & Scope

Stretching from Bathurst Street in the west to Parliament Street in the east, the scope is vast for a fine-grained design study. It poses the risk of becoming overwhelming in both extent and cost involved for a workable and politically-expedient design solution. Thus, the majority of the solutions will need to be targeted, with the aim of catalyzing development from a seed-location, broadening to a more extensive redevelopment at a later stage. Union Station and environs is the logical seed-location, along with the important north-south links of Bay and York Streets.

Thus, Bay-Ferry and York-Simcoe forms the core site. West Rail is a shoulder site linking to the proposed rail-cap park. East Yonge and Jarvis-Parliament form context and are for future redevelopment linking the East Gardiner Expressway realignment and redevelopment. Harbourfront will form part of the Gardiner’s interventions.

Throughout, a rethink is needed regarding the Gardiner Expressway and Lake Shore Boulevard’s relationship. Ramps need to be optimized, with westbound ramps preferably optimized to link...
to Lower Simcoe Street and eastbound ramps to link to Yonge Street and streets further east. Towards this goal, plans are afoot to demolish the off-ramp to Bay and York Streets in April 2017, replaced with a shorter, $22.4m (CAD$30m), Lower Simcoe ramp. Harbour Street will be widened to four-lanes, compensating for the demolished, single lane off-ramp. With potential positive impacts on street activation, the street will be reprogrammed for two-way traffic.
There are some glimmers of hope in new active façades on Lakeshore Boulevard, or some potential for reinvigoration of passive, yet porous, building frontage along the thoroughfare. One such property is Maple Leaf Square at 15 York; however, new buildings, like One York, have understandably, turned their service entrances, and thus their backs, on Lake Shore Boulevard. One York and Ten York have oriented themselves towards York Street and the aforementioned, to-be-demolished, off-ramps; this demonstrates that if a freeway/arterial amelioration plan is in place, developers will respond in kind to the street.

If Toronto is to retain the elevated Gardiner Expressway, its carrying capacity must be optimized with reversible lanes, using a zipper barrier. This would allow for 4-2 lane configuration inbound and outbound, reversing for morning and evening rush hour. If a large vehicular structure is to remain cast across downtown, it must be one of great efficacy, allowing at-grade Lake Shore Boulevard and Harbour Street to perform downtown street functions, catering to all modes. This is an urgent intervention, as time will favor the status quo, relegating Lake Shore Boulevard to forever play the role of a dead (to pedestrians/cyclists) street right through Toronto’s heart. Developers will respond if an approved streetscape improvement plan is in place. Buildings will be less reluctant to turn away from this street.
This site contains some of Canada’s most expensive real-estate. The price of high-rise residential accommodation in the downtown area is $477.07/sqft. (CA$6,727.01/m²) (Numbeo 2017). Much of this valuable real-estate is locked within the CN Rail corridor, adjacent to Union Station. This is ground zero for property in Toronto, located at the undisputed transportation nexus of the GTHA and dead center of Canada’s financial capital. Keeping this land functioning solely as a rail line is a disadvantage to the tax-base of the city, and an issue exacerbating land scarcity in the downtown core. Piling between the rails and building a developable platform above the rail-yards could unlock 106,040m² (1.14m sqft.) of air-rights.
In most locations, buildings turn their backs on the railway, making retrofits, by adding a deck above the existing rail corridor, plausible. The issue is not the creation of usable land along the rail corridor, it is making the transition onto it.

The current street fabric tunnels beneath the tracks at a grade slightly below that of downtown, but similar to that of the lakeshore to the south; for example: 82m AMSL (above-mean-sea-level) at Bay and Front; and 78m AMSL at Bay under CN Rails. All roads display an approximate 4m drop from Front Street to the rail underpasses. Only Lower Simcoe Street rebounds in the south by close to 3m at Bremner Boulevard. From Rogers Centre westward, the street fabric bridges over the rail lines.

The rails are consistently at 83m to 84m AMSL from the CN Tower to Yonge Street, thus the cap will have a surface level of 91m to 92m AMSL, when accounting for 7.01m structure-to-rail clearance required for associated structures, cantilevers and ground-fill caps (Transport Canada 1992). This proposed cap structural depth is at minimum, if cap tree planting is restricted to track medians, or within elevated planter boxes. This poses a design constraint of requiring a nine to ten meter rise from Front Street in the north, and an average thirteen meter rise from Lakeshore Boulevard in the south; plus an eleven meter rise from Bremner. AODA ramp structures cannot exceed 1:12 grade, requiring south ramps to have a length of 185m, including the required 20 landings of minimum allowable size and maximum allowable ramp rise (City of Toronto: Walking 2016). This is not a workable solution to surmount the grade change in numerous places, as space does not allow for it, and the solution would leave disabled persons exhausted. Thus in places, a compromise is made with some 1:10 and 1:8 grades in the most extreme cases, in addition to elevators being an option.
In two locations, a two step-up approach may bring Front Street up to grade with 91m AMSL of the rail cap. These places are the existing GO-Bus Terminal between Bay and Yonge Streets and Station Road between York and Lower Simcoe Streets. Both these streets are lined with inactive frontages and do not enhance the street fabric and may be given over as service alleys below a new proposed ground level. At these locales, providing ramps for a lower-level 5m clearance will be possible. However, getting to the rail-cap will require more creative solutions, as the direct grade across the distance would be 1:6 from Front Street.

It is recommended that the ‘bypass freight rails’ to the south of Union Station be continuously capped with a dedicated urban greenway. This will perform three vital functions; one, forming the link to the rail-cap park, proposed from Blue Jays Way westward; two, providing vital green space into a part of the city deficient in it, while creating a pleasant pedestrian link, and; three, creating a no-build corridor that preserves views for existing buildings to the south and any proposed new buildings to the north.

This is a major undertaking that would involve public and private sector cooperation to make it a reality. TOcore and City of Toronto’s Dept. of Planning have expressed concerns around inner-city residential intensification, without the adequate provision of urban open space. The balance of fiscal constraints versus those of cost of creation of public spaces needs to be addressed. This involves the balance of developable air-rights above CN-Rail lines versus public plaza, greenspace, and streetscape creation. This solution will encompass an area from the new Rail Deck Park at Blue Jays Way in the west, including renovations at Union Station,
continuing to Yonge Street in the east. The proposed development to be given the working title, \textit{Union}^\text{TO}. This will facilitate ease of referral in text, as well as giving the design meaning, in which \textit{Union} is reinvigorated by elevating it to the ‘power’ of \textit{TO}, by reconnecting it to the city around it.

The TOcore calls this green-corridor intervention ‘The Stitch,’ a proposed network of green fingers linking to the ‘Core Circle.’ This is a circular network of greenspace that encompasses the Toronto Islands, Lake Iroquois paleo-shoreline, former Garrison Creek, and Lower Don Valley and Rosedale Ravines. It is noted that even though there is the need for open space in the city proper, this will take a different form, compared to the more open parkland located within the ‘Core Circle.’ The need of ‘The Stitch’ is to bring natural elements to people, not necessarily bringing people into a natural environment. Thus, a more urban version of parkland will be more apt an intervention for \textit{Union}^\text{TO}.

Open space provision would include the addition of landmark parkscapes and open plazas to the east and west of the new Union Station train-shed. This is at Canada’s crossroads of transit, being kilometer one in the national VIA-Rail network, and the hub for all Golden Horseshoe transit; hence the working title, \textit{1Canada Place}. 
6.3 | Design Concept

The scoping study area was narrowed down to the key intervention area. A key catalytic project is needed to seed development along neighbouring infrastructural corridors. Thus, the core of the design intervention centers on a 250m to 300m broad swathe, from Blue Jays Way and the Rogers Centre, to just beyond Yonge Street and the start of The Esplanade into St. Lawrence Market.
**Figure 6.3.B:** Raw new UnionTO design 'blueprint' over existing aerial image of site

**Figure 6.3.C:** New parcels gained by capping CN rails at UnionTO (existing proposals indicated in grey)
New proposed parcels >>>

*buildings for illustrative purposes only, except those within existing building proposals

1. TMCC North (west parcel) | 12,937m² | 2 towers
2. TMCC North (east parcel) | 13,869m² | 2 towers
3. TMCC South (Convention Tower) | 3,041m² | 1 tower
4. 171 Front Street W. (Union Centre) | 3,923m² | existing proposal
5. York-Rail Square | 8,858m² | 3 towers
6. Delta Hotel Annex | 648m² | low-rise (affixed to existing)
7. 120 Bremner Annex | 612m² | low-rise (affixed to existing)
8. PricewaterhouseCoopers Annex | 801m² | low-rise (affixed to existing)
9. York-Rail Retail Box | 374m² | low-rise
10. Union Train-shed West Annex | 2,027m² | low-rise (affixed to existing)
11. Union Train-shed East Annex | 2,027m² | low-rise (affixed to existing)
12. S. Union Maple Leaf Square Deck | 321m² | low-rise (above-existing)
13. Air Canada Centre Annex | 880m² | low-rise (affixed to existing)
14. 141 Bay Street | *20,082m² | existing proposal incl. 141 Bay & green-rail-bridge
15. 45 Bay Street | *see above | existing proposal incl. 45 Bay & green-rail-bridge
16. 18 Yonge Annex | 896m² | low-rise (affixed to existing)
17. 1 Canada Towers | 4,690m² | 2 towers
18. 45 Bay – Yonge Annex | 576m² | low-rise (podium extension)
19. Sony Centre Creative Cube | 196m² | low-rise
20. Sony Centre South Annex | 241m² | low-rise (affixed to existing)
21. Gardiner Wedge | 2,675m² | 1 tower

TOTAL DEVELOPABLE AREA: \(79,674m^2\) (55,669m² excl. existing proposals)
Figure 6.3.E: Urban Open Space and Parks, Including Trees (Species & Locations Hypothetical for Illustrative Purposes)
See overleaf for greater detail and descriptions for the site.
FIGURE 6.3.G: UNION POINTS-OF-INTEREST MAP

1. John St. access
2. Rogers Centre
3. CN Tower
4. Blue Jays Approach
5. N. TMCC dev. site west
6. N. TMCC dev. site east
7. South TMCC tower
8. Ripley’s Aquarium
9. South TMCC entrance
10. S. Simcoe transition
11. Simcoe Place
12. N. Simcoe transition
13. 171 Front St. W.
14. 120 York St. Plaza
15. UPX Station & Skywalk
16. York-Rail dev. site
17. Delta Hotel & annex
18. 120 Bremner & annex
19. PwC & annex
20. York-Rail Square
21. CitiBank Tower
22. University/N. York portal
23. Union-Front Plaza: exists
24. Union Station
25. Union shed annex west
26. Union train-shed
27. Union shed annex east
28. Telus building & annex
29. Union Maple Leaf Sq. deck
30. Air Canada Centre
31. Air Canada office annex
32. 1canada Place
33. N. Bay transition
34. Dominion building
35. 141 Bay Street
36. Bay-Bridge merge/park
37. Air Canada Plaza: raised
38. 45 Bay St. & GO-Bus
39. 18 Yonge Street
40. 1canada Towers dev. site
41. N. Yonge transition
42. Sony Centre & 8 Yonge
43. 5 The Esplanade
44. Yonge Place
45. Gardiner Wedge
FIGURE 6.3.H: SOUTH LOWER SIMCOE TRANSITION LOOKING NORTH FROM BREMNER BLVD.

FIGURE 6.3.I: 1 CANADA PLACE FROM THE UNION TRAIN-SHED LOOKING EAST TOWARDS 45 141 BAY.
6.3.1 | Blue Jays Way to Lower Simcoe Street | Including TMCC Remediation

The westernmost part of the site is where the core of the UnionTO project links to the proposed Central Rail Deck Park, onwards to The Bentway beyond Spadina Avenue. It links to neighborhoods further west, like Liberty Village. At this location, the rail deck will be at its narrowest point, where the CN-Rails narrow to between 40 and 50 meters, between the existing Northern Toronto Metropolitan Convention Centre (TMCC) and CN Tower. This is where the viability of the TMCC comes into question on its existing site.

The TMCC will need to be addressed, as current site constraints have placed the city at a huge disadvantage when it comes to business and conference destination marketing efforts. It remains to be seen if an *in situ* refurbishment, or a TMCC move and site redevelopment, is more apt for site design, and the city’s commercial and economic needs.

The TMCC experiences demands exceeding the parameters of the site. Convention and business destination pundits claim that 55,740m² (600,000 sqft.) of contiguous exhibition space is

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**Figure 6.3.J: This section - close up**

1. John St. access
2. Rogers Centre
3. CN Tower
4. Blue Jays Approach
5. N. TMCC dev. site west
6. N. TMCC dev. site east
7. South TMCC tower
8. Ripley’s Aquarium
9. South TMCC entrance
10. S. Simcoe transition
11. Simcoe Place
12. N. Simcoe transition
required to take Toronto from its current 33rd place, into the top-ten of convention destinations in North America (Dhillon 2013). Their existing contiguous space is inadequate. Southern Hall DEFG, hosts 24,175m² (260,000 sqft.), and northern Hall-ABC, hosts 16,908m² (182,000 sqft.) of exhibition space. Size has been a problem since it was highlighted by the city casino and convention extension application in 2013. Hall-ABC could be blown out to 25,340m² (272,757 sqft.) if it were to utilize the rail-cap. Although, this expansion could compromise the rail-cap urban greenway.

The only sites viable for a 55,740m² floorplate required, within the central city, lays to the east of downtown, within brownfield sites towards the Lower Don Lands. Even if expanded on its current site, the current TMCC would require significant upgrades, as the current layout is somewhat fragmented, and the interface with the city is lacking owing to its defensive architecture. The current TMCC level 2 floorplate height, and CN-Rail grade level, are not congruent with expanding Hall-ABC by simply *tacking on space* to the south. It would be necessary to either raise the entire exhibition space floorplate of Hall-ABC, or sink the rails by a few meters. This endeavor would be costly, being a huge retrofit to an ageing building. Given its prime location, the center is likely more valuable as developable land, with the TMCC moved to a new, proximal site that would allow for sufficient contiguous exhibition space. This would allow Toronto to vie for the title of North America’s foremost conferencing cities.

The southern facility of the TMCC could remain as a central city site, remote, but part of the TMCC network, continuing to provide a proximal 24,175m² (260,000 sqft.) event option, adjacent to the CN Tower and Union Station. The Queens Quay and eastern LRT extension would provide the link to a new 55,740m² (600,000 sqft.) TMCC facility, integrated with mixed-use and hospitality developments, east of the city. A likely site is located east of Cooper Street to the
reclaimed lands of the East Gardiner Realignment, but probably not as far as the Port Lands. A site closer to Cooper Street is recommended, rather than further east. Large convention centers within cities rely off their proximity to excellent transit and urban amenities. The closer a new site is found to Union Station, the better. This may be difficult as development is sought after in this area. This is where a phase two of rail capping between Yonge and Jarvis could come into play, possibly hosting a new, expanded TMCC facility.

The redevelopment of the TMCC site would unlock 27,140m² (292,132 sqft.) of developable land, excluding parts of the parcel reserved for egress from John Street to Rogers Centre. Another reason for the removal and redevelopment option being more viable is that if the expansion of Hall-ABC to the south is to be expanded sufficiently, it would pinch the urban greenway and make it prohibitively narrow, leaving the core of the UnionTO project, and 1Canada Place, orphaned from Central Rail Deck Park. This would leave the TOcore ‘Stitch’ incomplete.

The Northern TMCC redevelopment will take the form of a mixed use base (pedestrian grade level), integrating local Torontonian business functions on Front Street W., and touristic and leisure needs in the south at CN Tower, Rogers Centre, and environs. In keeping with the employment-provision tenet of the TOcore proposals, the two eastern tower sites are proposed as commercial, the two western sites as residential. It is advised the two western towers be split along the east-west axis alignment of the urban greenway, ensuring the sun setting on the equinox aligns directly with the urban open space.

An arcade-style pass-through is proposed between eastern and western parcels of the TMCC redevelopment, ensuring greater pedestrian connectivity. This would aid in creating more walkable short-blocks and provide more opportunity for egress onto the rail-deck.
The public-space proposal for the Blue Jays Approach section is a throwback design with a post-modernist flavor. It mirrors the existing look and feel of the CN Tower and Ripley’s Aquarium site. Although newer design methodologies might be in vogue, in context, ignoring the time this place originally come to be, would be ignoring what made modern Toronto. Merging the post-modernist urban environment with the best-practice placemaking of today, would be most appropriate to seamlessly merge extant and proposed spaces.

Despite murmurings of the Rogers Centre requiring up to $299m (CA$400m) in upgrades, no proposals are expected until late-2017, and shall thus not influence the current design (Reichard, 2017).

With the decking of the rails, the reasons for the elevated PATH system from the Skywalk to Ripley’s will be defunct. This will unlock development potential for a South TMCC (Convention) Tower. A new base structure of 3,041m² (32,733 sqft.) would be attainable, with development rights for a 40m x 40m floorplate (at min.) tower above. This could take the form of a large-floorplate residential or smaller-floorplate commercial tower, depending on developer and market demand. Commercial may be more congruent with current podium use, linking to the South TMCC entryway and breakout venues. The South TMCC structure is carefully integrated into the south Lower Simcoe transition, needing minimal structural interventions. The intervention uses a stacked and stepped design, to merge the existing building into a changing grade to the south and east. The Lower Simcoe-Bremner Park will be redesigned to suit this.

At this point, the urban greenway’s public space begins to morph into a pedestrian street design, ensuring a vibrant space, using tried-and-tested forms that find favor with most residents.
6.3.2 | Lower Simcoe Street to Union Station (West)

Lower Simcoe Street provides one of two locations where grades (AMSL changes) allow for a 1:10 to 1:12 transition from Front Street to the rail deck and south to Bremner Boulevard. The dedicated bike lane will be moved from street-grade to deck-grade. Bio-swales and tree planning will be contiguous along the bike alignment, providing protection for pedestrians and cyclists, but also ameliorating runoff from the rail-deck to the north and south. Pervious paving will accompany the bio-swale alignment.

The North TMCC redevelopment and 171 Front Street W. developments are urged to address this ‘new street’ and grade change. 171 Front Street W. should be able to do this with minimal design modification, as Station Street grade is already inactive in the design proposal; the design places its active level and entryway at the level of the Skywalk and UP-Express Station.
Lower Simcoe Street would dive beneath the deck 40m (131ft) south of Front Street and emerge 60m (196ft) north of Bremner Boulevard.

At the southern transition, the Delta Hotel needs careful consideration. The skywalk between the hotel, PATH, and South TMCC, has been removed, as this is now at deck-grade. Further south, the transition is handled 5m from the current building curtain wall, allowing light to reach lower windows. The gradual grade change is achieved further west, with a stepped grade transition happening eastward at the building envelope. This allows the Delta Hotel to retain the entrance on Lower Simcoe Street. Elevators are proposed at this transition, in addition to gentle grade changes, aligning interventions with AODA (Accessibility for Ontarians with Disabilities Act) codes.

North of the Delta Hotel, 120 Bremner, and PwC (PricewaterhouseCoopers), it is proposed the podiums be extended between 10m and 18m into the rail deck. These retail/mixed-use additions (called annexes) would unlock 647.5m² (6,970sqft. | Delta), 612.5m² (6,593sqft. | 120 Bremner), and 800.8m² (8,611sqft. | PwC) of developable parcels. In keeping with the street aesthetic, it is suggested these structures at the southern pedestrian axis, not exceed 3-to-4-storeys in height from rail-deck, in keeping with the urban morphology of Toronto. It is not required these structures have the Bay-and-Gable or Victorian architecture, but their massing should mirror it. The urban design image of Front Street E. at Wellington Street and Queen Street W. at Beverley Street should be enlisted.

These at-deck-grade retail annexes will open up onto the pedestrian street, or urban greenway, creating a vibrant streetscape, feeling more like an at-grade thoroughfare than faux-ground-level. The street will also be modelled around the short-block concept, ensuring continual egress
from at-grade streets and visual interest. Where the street opens into plazas, these are positioned on axis with gaps in the towers, ensuring maximum sunlight reaches public-spaces below.

The northern pedestrian axis along the UP-Express Station, will have *deck-to-rail windows* open to below, allowing both light and visual cues of site-function to permeate. Micro-gardens will be placed between *deck-to-rail windows*, allowing those at deck and track level, to draw visual benefit.

Between the aforementioned north and south axes, a large 8,858m² (95,347sqft.) parcel, York-Rail development site, is made available on the rail deck east of the Union Station platforms. A podium could easily accommodate three towers of 60m X 40m, 30m X 30m, and 28m X 40m floorplates. This configuration could also provide for mixed use, allowing for the provision of highly-coveted residential space, and additional commercial job opportunities. Reiterating sunlight concerns, locations of public-gathering space at the south of this site, along the pedestrian axis, is placed on-center between buildings to the south (Delta; 120 Bremner; PwC; Telus), ensuring insolation reaches these spaces.

York-Rail Square is the working title for the public space above the east Union Station platforms. It employs a north-south trending, double-Y design, funneling pedestrians along the York Street axis. It also employs the aforementioned *deck-to-rail windows* to the long platforms below. This space will have a pluralistic design, with east-west axes mirroring the golden age of rail travel, mirroring the era until 1927, when the current Union Station was built. The north-south axes will mirror the modern boomtown of Toronto. This will be reflected in urban amenity fittings and furniture in York-Rail Square. Wrought iron, steampunk-styled rails will be affixed to the *deck-to-rail windows* east to west. While north-south railings will be reinforced glass. Every second rail-deck strip, strategically located between tracks, will be planted to enliven the deck and track
levels. The existing steel, arched trusses over the eastern rail platforms, will be relocated to the deck above. This is a vertical transfer of built-forms to bring the upper rail deck in design lockstep with site-function below. These trusses can be repurposed for lighting and aesthetic purposes.

The North York Transition to Front Street level is more complex, due to the constraints of a 65m distance to the rail-deck, and the flanking, historic buildings of 20 York (7 Station) and Union Station. These buildings will require an aesthetic setback from their façades. North York Transition ramps and stairs will have glass railings, making them as visually transparent as possible to the historic façades. This transition also needs to be integrated into the proposed 171 Front Street W., York Plaza. It is recommended this plaza be moderately revised to address the activation of the new plaza, enhancing retail opportunities at the Skywalk/UP-Express Station and CitiBank Tower.

To make this all possible, pedestrian space was appropriated from vehicular space, by employing a cut-and-cover structure to place York Street below-grade from Front Street W. Vehicular access will be provided via University Avenue to Front Street W. and continued access via Wellington St. W.

The public space around CitiBank Tower will be integrated carefully into a more modern and appropriate public space on the York Street transition. Existing modernist spaces, with its functional and rectilinear form will prevail, facilitating a design-blend, merging into more current design methods further from the vintage building.

The North York Transition enters the upper Union site via a grand set of stairs (kept to a minimum) and ramps, albeit in most places, ramps will be made to feel like natural inclines than artificial grade changes. Green spaces and places to linger will be provided throughout, from
Front Street W. to the rail-deck level. The southern York Street transition is less impressive due to site constraints. It employs a multi-mode of grade-change access to make this less-glamourous solution more interesting and enticing to those on foot.

6.3.3 | At Union Station

Union Station is undergoing a massive overhaul and these efforts shall not be ignored. The new glass canopy, or train-shed, looms over Maple Leaf Square and the railway platforms. Its giant milky-blue, glass structure is quite imposing. It will be integrated into any future interventions. Therefore, two gateway structures (train-shed annexes) of mixed- and station-use are proposed to the east and west of the new train-shed. These structures should mirror the massing of the front of Union Station, whilst integrating the glass façade and ceiling treatments of the existing structure. This would add 4,054m² (43,637sqft.) of developable space to the flanks of Union Station.

The southern entrance from Maple Leaf Square will facilitate rail-deck access to this square at Air Canada Place and Bremner. Stairs are located to the west of the space, as the Air Canada Galleria and existing entrance to the PATH and Union Station, are located to the north-east corner. The stairs will carefully complement the ‘hanging box’ quality of the eastern façade of the Telus Building. The midpoint of the stair-transition will feature eateries within a new 321m² (3,455sqft.) facility.
(Union-Maple Leaf Square Deck) atop Union Station’s York Concourse entrance. This attractively breaks the daunting grade change, entices exploration up-grade, while providing deck-views across Maple Leaf Square.

6.3.4 | Union Station (East) to 1Canada Place

The eastern flanking portal at the train shed will face a grand new plaza atop the rail-deck; it is located at the number one address in commercial and financial Canada, Bay Street. Union Station is the nexus of transit in Canada, and Bay Street, fulfils the role of Wall Street of the north, with 1Canada Place proposed at this epicenter for people, financial networks, and transport in the nation. Giving Toronto a space that is uniquely, but not overtly, Canadian, is a challenge. Torontonians often assert that their diversity is both their identity and their strength. Providing a landmark space that speaks to all, is complex, especially when the place created should not be transferable to any other locale in any another city.

Thus, 1Canada Place asserts place it in a subtle manner, only discernible from above as a symbol of the nation. The landscaping will speak to this, but only to those who care to notice, in the showcase of Acer-species (maple) from

\[\text{Figure 6.3.M: This section - close up}\]

30. Air Canada Centre
31. Air Canada office annex
32. 1Canada Place
33. N. Bay transition
34. Dominion building
35. 141 Bay Street
36. Bay-Bridge merge/park
37. Air Canada Plaza: raised
38. 45 Bay St. & GO-Bus
around the world being employed throughout the site. Maples are pan-hemispheric, but a symbol of one nation.

A water feature and reflecting pool are placed on axis to Union Station, symbolizing the leaf-stem of the park design. Within the park, active elements, such as performance spaces, are provided in the south, with playground and play spaces provided in the north. Central areas act as passive spaces for gathering, picnicking, or just to people-watch. Within this space, deck-to-rail windows will be added, providing light to the east platforms below. Fourteen plinths will be placed to the north and south along the bottom edge of the leaf-design. One plinth shall represent the entire country of Canada, with the thirteen others representing the provinces and territories making up Canada. The fourteen plinths will be carefully designed to honor and represent all elements within its sub-national area.

The northern transition at Bay Street is complex once more, owing to historic Union Station and the Dominion Building, flanking it to the left and right. Again, detachment from any façade ensures visual porosity from the building to the streets, through ramp and stair structures. For large portions of the transition, bio-swales are included, dealing with rail-deck run-off.

To the south of 1Canada Place, a mixed-use/retail annex will be added to Air Canada Centre, activating the northern façade of this monolithic structure. The design methodology and guidelines will mirror the annex buildings north of Delta, 120 Bremner and PwC. The additional space amounts to an 880.5m² (9,478sqft.) parcel.

The southern transition at Bay Street, hides the vehicular street beneath a capping public square, with the ground level raised to level-2, relative to...
surrounding buildings. This proposed raised plaza would link the Air Canada Centre to the proposed GO-Bus Terminal and retail developments within 45 Bay’s podium. This building, with its green-rail-bridge, is already in the approval process, and has thus been integrated into the design. This development moves the GO-Bus facilities from north of the rail corridor, to this site south of the rail corridor. Again, some parts of the raised-deck are placed several meters from building façades, or given ‘portals-to-below,’ treatments to allow light to penetrate to extant lower levels. This ensures only minor design modifications needed to 45 Bay.

Finally, the transition to ground level, south of the Air Canada Centre raised plaza, will be a set of stairs and ramps to the north of the Gardiner Expressway. The elevated walkway could be extended to traverse Lake Shore Boulevard beneath the expressway, ending north of Harbour Street.

At 141 Bay, some minor modifications may be needed to fully integrate the façade and sky-lobbies with the new rail-deck transitions. This is kept at minimum, and even includes the integration of the green-rail-bridge between northern and southern development proposals. Further investigation may find the 95m AMSL height proposed for the rail-bridge may be overly high. The design may be able to get away with dropping it by a few meters, provided major tree planning is done within track medians. A height readjustment would facilitate better integration with the greater UnionTO project.
6.3.5 | Yonge Street & Environs

The eastern portion of the 141 Bay development requires a level-2 deck, integrated with the proposed multi-story retail in the eastern podium. This includes an additional 575.7m$^2$ (6,197sqft.) of developable space to the east of the podium facing Yonge Street’s rail-deck.

Within the heart of the precinct, another 6,690m$^2$ (50,480sqft.) is made available within a new development parcel, 1Canada Towers. The podium should provide active frontage, particularly to the southern urban greenway pedestrian space. The two proposed towers may take on either commercial or residential function. These dual 40m X 40m floorplate towers can fit atop this parcel’s podium. South this site, at the edge of the rail deck, another 896m$^2$ (9,644sqft.) annex structure is proposed for 18 Yonge. This takes similar form to those annexes previously proposed.

Yonge Street is the opposing, eastern bookend to Lower Simcoe Street, where a gentle transition is made possible by broader site constraints: a 120m (394ft) distance from Front Street E. to the rail-deck, and a poorly developed urban fabric.
to the south. Similarly, bike lanes will be included on this axis, forming part of the TOcore ‘Stitch’ and moving it from street-grade to deck-grade. This will form a major non-motorized transport corridor between Yorktown, downtown, and the lakefront and Toronto Islands.

The northern transition is constrained by narrow sidewalks, and the Dominion Building. The transition is kept to the east of Yonge and incorporates the Sony Centre for the Performing Arts, with the new Sony Creative Cube providing space for creative sellers and local artists. A transition will also be added with The Esplanade, to link the St. Lawrence Market to this crucial thoroughfare. The deck edge will take the form of a rounded triangle to the east, where it meets the Flatiron-like building at 25 Esplanade, mirroring this building’s design. To the north, along the new 241m² (2,594sqft.) restaurant/s or retail development of South Sony Annex, the deck will transition to ground level at The Esplanade. To the south, space is provided for future rail-deck extension between 5 The Esplanade and 25 Esplanade.

Bio-swales and planning corridors follow the bike lane’s alignment, facilitating the capture of run-off as it flows north and south to rail-deck edges. The pedestrian circle at the southern end forms a grand end to the urban greenway (pending future eastward additions).

The southern Yonge Street transition will provide for three options. Firstly, the AODA-friendly elevator at 18 Yonge Annex to ground level; secondly, the rapid downgrade grand staircase option, that preserves the façade integrity of 18 Yonge, and its service/parking egress, or; thirdly, the gradual transition on the eastern side, including bike lanes, gently dropping to ground level with associated active frontage in a new Yonge-Gardiner Wedge development. This elevated state will continue over Lake Shore Boulevard under the expressway, to meet grade at Harbour Street.
The Gardiner Wedge will conform to the new grade transition along the east of Yonge Street, bridging over the Gardiner off-ramps, providing an additional parcel footprint of 2,675m$^2$ (28,793sqft.) and associated podium development space. Active frontage will face the new grade-transition to the rail-deck. The northern façade should retain the ability to be activated, pending a future deck extension to Lower Jarvis Street. This site could easily accommodate a single tower of 40m X 50m.

6.3.6 | Gardiner Expressway & Lake Shore Boulevard

Upon closer inspection of the site, it was found the CN Rail disconnect was more profound than that posed by any elevated or at-grade thoroughfare. However, remedial action is still required to remediate this southern portion of the ‘grey ribbon of disconnect.’

As previously stated, the elevated Gardiner is not operating at optimal capacity, with the deck configuration not taking rush-hour directionality into consideration. A traffic study needs to be conducted to back up, or debunk, evidence that a median zipper may alleviate traffic pressure. Traffic flow would have a 4 (inbound) – 2 (outbound) lane configuration from 05:00 – 09:00 in the morning and 4 (outbound) and 2 (inbound) from 15:00 (3pm) – 19:00 (7pm) in the afternoon. It would revert to a 3 – 3 lane configuration during other times. Abovementioned interventions should facilitate the maximum movement of through-traffic, in so that below, only downtown traffic is using Harbour Street and Lake Shore Boulevard.

It follows that Lake Shore Boulevard will be re-engineered and redesigned to operate as a main downtown street, not as a placeless arterial through-route. The developers of 45 Bay Street have eluded to potential improvements, articulated within their landscape plans submitted for development approval by the City of Toronto.
It can be seen that towards Yonge Street, the Lake Shore Boulevard curb-line has been brought in by one lane. This provides us with clues as to the maximum carrying capacity of this road at its pinch-points, eluding to possible road-diets. This will include the addition of bike lanes and improved pedestrian sidewalk spaces.

Such spaces might include pillar interventions similar to Via Verde, with vertical green walls, in addition to landscaping and creeper (plant) screens between non-motorized and the vehicular...
right-of-way. Green interventions will assist in improving the pedestrian spaces and encouraging more active store frontage onto Lake Shore Boulevard. These too, will reduce noise pollution and defuse vehicular exhaust emissions.

Lighting also needs to vastly improve. Appropriate lighting will encourage night-time street activity, as high-mast, poor pedestrian-scaled lighting will leave security perceptions wanting. Indirect lighting, including LED up-lighting and variable amenity lighting is recommended to add to the allure of the space.

It goes without saying that the viaduct and its support pillars require significant structural improvements. In many places, the rebar is exposed, concrete is cracking from the structure, and subsequently, rust marks are clearly seen. After Gardiner Expressway rehabilitation, the bents and I-beams should be attractively painted. White is not advised, as it will rapidly look unsightly. Urban art could easily become part of the Gardiner’s pillar structures where green infrastructure is not employed, including lighting to emphasize these installations at night.

The Gardiner Expressway deck should not be forgotten. The issue with this structure is not only that is exists, but that it is all function and no form. Located right in the heart of Canada’s premier city and financial capital, it remains functional blight. The lighting and structural form should augment its function, reflecting where this freeway performs this function. San Francisco’s new eastern-span of the Bay Bridge provides a glimpse of what can be done if high-performance LED lighting meets design (see Fig. 6.3.R overleaf). This would transcend urban freeway and elevate its function to engineering artwork, finally befitting its location front-and-center in Toronto.
6.4 | Design Summation

The design is confronted with one critical issue, how to attract people up to the rail-deck. The design needs to change grade with minimal effort to the pedestrian and cyclist. To the user, it needs to feel like walking up a gentle, natural hill, not an artificial barrier that requires effort to surmount. This is easier said than achieved, particularly adjacent to existing structures with limited façade workability. However, despite working within these constraints, this gentle grade-change was achieved at Lower Simcoe and Yonge transitions, with enticing and visually alluring transitions created at Bay and York Streets. All transitions were achieved by remaining on axis with the city fabric, ensuring visual permeability is implied to users.

In places where grade-changes and existing buildings were problematic, an exercise in satisficing ensured historic façade integrity, in lieu of a slightly more abrupt grade change. In such cases, additional ‘pedestrian carrots’ are added, ensuring any vertical change grants users a tangible reward. This is achieved through art installations, creative spaces, niche retail and culinary choice. Aesthetically, these ‘carrots’ are bolstered by making any transition interesting and visually appealing. This must be achieved by keeping line of sight of the street grid (gaps within city
towers) visible, as to insinuate to the pedestrian this grade-change is indeed, a through route. The rail-deck’s pedestrian patterns need to be congruent with the surrounding street grid to ensure its integration with it.

UnionTO is an incalculable improvement form current conditions. Teamways and road underpasses (tunnels) are huge physical and psychological barriers to north-south pedestrian can cyclist movement. Daylighting their path between the lakeshore and downtown ensures greater connectivity. Greater connectivity ensures greater footfall, and is a windfall for retailers and downtown commerce. Not only does the design facilitate greater and more pleasing connectivity north-south, it provides a pedestrian thoroughfare trending east-west. This links critical urban amenities within Toronto, from Rogers Centre and the CN Tower (and current TMCC), through to Union Station and the greater PATH-network.

The majority of the rail-deck will remain urban open space, to ensure acceptance within the TOcore ‘The Stitch’, as well as the broader urban park’s strategy of the downtown plan. These spaces will bolster the provision of green space in the grey heart of downtown, sequestering air rights for the public good. Signature space, 1canada PLACE, aims to provide both active and passive park space, with plazas, playgrounds, lawns, performance spaces and water-features. National imagery and art is included, giving it a sense of place and securing a fondness in the hearts of Canadians of all backgrounds.

This is simply one part of the urban open space system. York-Rail Square will be a landmark in the city, with all north-south axes being attractively landscaped and providing green-infrastructure, such as bio-swales for runoff management. The east-west trending urban
greenway will provide the link between the proposed Bentway and Central Rail Deck Park, with the heart of UnionTO and the city center.

Development opportunity is ample, ensuring decking and open space is paid for with gainful and balanced development. The rail deck will cover a total area of 10.6 Ha, unlocking a total of 55,669m² of developable parcels. This figure swells to 79,674m² if pending existing proposals associate with the project scope are included. For comparative purposes, this would greatly exceed the entire Eaton Centre footprint of ±36,950m². The job-creation, property development, retail, and tax-base spinoffs cannot be underestimated. Gaining 1.5 to 2 Eaton Centres above the CN-Rails would change Toronto for the better, forever.

Despite being more extensive and initially expensive, the UnionTO plan atop the CN-Rails is where the design solution exercises more control. Lake Shore Boulevard and the Gardiner Expressway is less under the direct control of design interventions. Developers have stamped their building configurations on Lake Shore Boulevard already and it is not favorable to the pedestrian. There is the potential for direct interventions to the road right-of-way, but not much that can be done to the building envelopes that surround it. Streetscape and viaduct improvement would entice developers to slowly remediate the problem of poor street activation and impervious building envelopes. The plight of Lake Shore is not lost. Developers have responded in kind to design/infrastructural interventions before, such as Ten York’s more permeable façade in reaction to the removal of the York-Harbour off-ramp. Thus, design
interventions will stem the tide of creating dead façades facing the Lake Shore, aiding in invigorating spaces under the Gardiner Expressway as a bone fide urban street.

**Figure 6.4.A: The Gardiner Expressway as it is in 2017**
7  | Conclusions

7.1 | Lessons

Toronto is the undisputed economic capital of Canada. The city presents a gleaming example of success two-hundred meters up, but forgets to have the streets at ground level follow suit. The city has allowed frugality to overrun every decision, to the detriment of its future frugality and public image. Being overtly careful about the public purse today hurts the future public purse, if all public investments are seen as frivolous, regardless of being a sound investment or not. A neglected urban core will eventually contaminate the suburban and exurban extremities. The urban core needs to be cherished, not just by neighboring jurisdictions and outer-Toronto, but also the Province of Ontario. A robust economy in Toronto is the engine that will drive the province forward.

This design presents Toronto with an opportunity to show all residents, urban, suburban or exurban, that acting for the urban good benefits all citizens of the Greater Toronto-Hamilton Area. What is required is right before us, the solutions may have just been more difficult to articulate and design. Toronto is disconnected from the lakeshore. Toronto is in the midst of a property and economic boom. Toronto is Canada’s foremost urban economy. Toronto lacks land and lacks quality public space. Toronto continues to lack signature streetscapes and parks.

The solution to sequester the air-rights above the CN-Rails around Union Station seems obvious. Where there is no land, we create more. Where a path is dark and ominous, we create routes above it. Where there are no public parks, we put it above areas that grant no public access. Where there is a desire for funding and an improved tax-base, we create opportunity for economic activity where there was none. This is the crux of the UnionTO proposal.
Toronto has an unassuming uniqueness that is often overlooked. Toronto was famously referred to as, “New York run by the Swiss,” by actor Peter Ustinov. A moniker given to a city-anywhere, a place that can pose as any other. While locals can seldom cite a singular Torontonian identity, the design question must still be asked: ‘What is the Torontoness of Toronto.” Perhaps it is everything and nothing at the same time. It is its ability to be all things to all people, it is its ability to do the ordinary extraordinarily well. It is remarkable in its unremarkableness; doing everything relatively well, but doing no singular thing astoundingly (for the most part).

A takeaway for Toronto is to not assume that it has nothing that makes its places irreplaceable; that any public space design will do, whether made for it, or not. Toronto is exceedingly unique, appearing Victorian and Pacific-Rim simultaneously. No other city quite possesses this juxtaposed built-form. It should be celebrated in design and in public space. Applying Vancouverism-Light or public space anywhere to its urban fabric is not doing the city any justice. Toronto’s spaces, especially when at high-profile locales and utilizing public money, deserve lead-designers who understand the city and design with a local heart. Toronto deserves the best and this is what UnionTO and 1canada PLACE attempts to give.

7.2 | Limitations

The frugal history of Toronto urban governance is also a limitation. Although some of the ultra-neoliberalist, and suburban-first ideology has relaxed post-Ford, the cost-conscious mind set and aversion to large public-works spending, remains part of the city’s DNA under John Tory. Thus, it has been an exercise in balancing two contrary ideals; one, a workable and highly impactful design solution to link downtown to the lakeshore, and two, not proposing a design that is perceived as ostentatious or the pursuit of spendthrifts.
The design needs to meet the needs of the city, its urban residents and inner-city investment, all whilst convincing suburbanites this is public money well spent, with huge tax-base benefits, that won’t frivolously divert resources from the greater GTHA to inner-Toronto.

TOcore, the working group for the comprehensive plan for downtown Toronto, have also set some limitations. They do not seek development at all costs. The city is already in demand, and the residential population is increasingly dramatically. What TOcore’s working groups require is green space and completing a ringed park system with green ‘Stitches’ into the core of the city. Thus, the design had a limitation on how much of the rail-deck could be given over as developable parcels, without putting the goal of more inner-city green space in jeopardy. Developable parcels versus open space must be balanced that the former pays for the decking providing for the latter. The entire UnionTO site had to reach this balance of high quality and integrated urban open space, with aesthetically sensitive development, considering sightlines and sunlight.

The site’s rail lines were the largest limitation, and more so, their height above the surface streets of Toronto. For the most part, the rails are at 83m AMSL. The streets vary between 78m AMSL (south of the site) and 82m AMSL (north-west of the site). Having an Ontario Department of Transport imposed 7010mm height limitation of decking structures above rails, meant in numerous places, the deck needed a grade-change of between 13m and 9m. This all needs to be done whilst making grade-changes enticing and as seamless as possible for the pedestrian and cyclist. It also must be done while maintaining AODA compliance or finding alternative methods of access that remain disabled friendly. This needs to happen within an already built-up city with valuable real-estate. Worded as such, the task seems insurmountable. In the design phase, concessions were made for historic façades, grade-changes were meticulously and
thoughtfully designed, architectural and activity draws were embedded into transitions, and the
design solution came into focus.

The transferability of the design to other locations remains in question. The unique limitations of
the site in Toronto mean many of the designs are tailored specifically for the buildings, roads,
rails and specific nuances of the area. However, there are countless cities around the world that
grapple with a similar issue. Many downtowns and dense urban areas have rail infrastructure that
is not below-grade. Many of these locations cannot sink their rail lines, for budgetary, political or
logistical reasons. Few cities have yet to surmount the issue of bridging a rail line that presents
a grade-change conundrum. Currently, only one immediately springs to mind, the Rive Gauche
development in south-east Paris. The only known North American project in the works is
Burnham Place in Washington, DC.

Toronto’s UnionTO project may provide impetus and design direction for other Canadian cities.
Winnipeg’s own Union Station and rail line separates the downtown from the Red River and The
Forks entertainment and park district. In Calgary’s southern downtown, Gulf Canada Square and
Sky 360 already straddle the east-west trending rail lines. It could be the first in a much more
extensive and holistic urban design attempt to link downtown Calgary to the Beltline
neighborhood and famous Stampede to the south. Perhaps one day, using the Toronto
template, Vancouver’s Gastown could be reunited with the Burrard Inlet shoreline over the
Canada Pacific Rail Yard. These visions of healed urban fabrics could be extrapolated to cities
south of the border.

7.3 | Future Research

The design solution does not exist in isolation. An economic study of the potential impacts of
such a major intervention should be conducted, including a full cost-benefit analysis. This might
be done using rail-decking projects in other rapidly growing cities and their impact on subsequent investment and city tax-base. Such places may include cases included in this study, like Curzon-Birmingham in the UK, Federation Square in Melbourne, Australia or one currently under development, the Rive Gauche project south of Gare d’Austerlitz in Paris, France.

Another research direction would be the appropriate way to integrate the TOcore ‘Stitch’ idea into the city. It remains to be determined if the best way to employ this is through creating greened thoroughfares, elongated parkland into the urban core, or simply creating more complete streets, including street plantings, like along the King Street Transit Corridor. Some might argue that conduits bringing wildlife into the urban core may do more harm than good. Others may argue not making provision for greenspace that interlinks with the ravine system is denying nature and Torontonians of a complete system of parks. This needs to be determined by others.

Moving the Toronto Metropolitan Convention Centre (TMCC) and the economic implications also needs to be investigated. A fixed site for a new, larger TMCC facility has not been suggested for this reason. Area suggestions are made to coincide with future transit plans outlined by the City of Toronto Transportation Planning Department. The financial impacts for the redevelopment of the old north-TMCC site needs to be weighed against the cost of new TMCC construction, and potential conferencing spin-offs. This method may prove most sustainable, as it allows the city to maintain a conferencing venue during construction, avoiding damaging decommissioning of conferencing venues without replacement.

The Gardiner Expressway and Lake Shore Boulevard interventions would benefit from a traffic study, determining the viability of road-diets at-grade and reversible lanes on elevated sections. As with the demolition and replacement of York and Habour Street off-ramps, some other
onramps to the east may benefit from consolidation at Yonge Street. The current situation has a redundant number of, and width of, viaduct ramp structures. This leaves the at-grade spaces darker and confuses unwitting motorists. Non-motorized improvements to Lake Shore Boulevard may require the appropriation of one lane. These shared-street improvements would require a traffic study to convince traffic engineers this will not cause traffic chaos in the area.

7.4 | Recommendations

It would be worth looking into synthesizing some design ideas within this document, into the TOcore process. It may also be valuable to have the design solutions presented to the stakeholders in the City of Toronto, for further discussion within their respective departments and potentially, touting some ideas with council. It may be of value to approach VIA-Rail, CN-Rail, GO-Transit, and Metrolinx for comment, as well as incorporating the input of the Rail Deck Park (Blue Jay to Spadina) scoping study group. The Province of Ontario may also be enlisted at a later stage, as many processes may be reliant upon their support.

It is recommended this intervention not be seen in isolation, but thoroughly integrated into neighbouring design interventions and potential extensions of the scheme. These include westward links to the Rail Deck Park, the Bentway and developments around Exhibition Place and Liberty Village. Additionally, new eastward links to the Gardiner Expressway Realignment, Distillery District, and Villiers Island and Port Lands needs seamless integration, perhaps along a rail-deck and LRT corridor from Yonge to Parliament Street and onwards. An eastward phase two cap may also house a future, expanded TMCC, enabling the facility to meet conferencing expectations for a city of Toronto’s stature.

North-south links require further strengthening and streetscape improvements, particularly, Yonge, Bay, York and Simcoe Streets. Bay Street will form the main axis between a burgeoning
downtown, transit hub of Union Station, and the Jack Leyton Ferry Terminal development on the lakeshore. Bringing more development to the urban core may also require the acceleration of the TTC-Subway downtown relief line study, as TTC-ridership will potentially balloon further.

The opportunity for Toronto included herein should not gather dust, now is the time to act. Whether or not the design solutions are employed as proposed, this document should not be relegated to a shelf. In the least, it should foster debate around the future of Toronto and how to make it a world-class city. Parts can be accepted as beneficial and other parts may be tweaked or discarded. However, to ignore this opportunity, turning backs to the rail and freeways, will mean development will continue apace. Development will factor these ‘grey ribbons of disconnect’ into the built fabric, leaving the urban environment all the poorer for future generations. Toronto will have missed the opportunity, when the opportunity to shape that part of the city still existed.
8 | Appendix

8.1 | Other Versions

This is the US version. A Canadian/International English version is available.

8.2 | International Language & Units of Measure

This is a transnational thesis spanning the academic environment of the University of Cincinnati, OH, United States and the study site of the city of Toronto, ON, Canada. All monetary amounts quoted herein are in US-Dollars, as a major proximal reserve currency, rather than CA-Dollars, for ease of comparison. Foreign currency amounts were calculated at the November 2016 exchange rates. All nominal measurements, sizes and areas are in SI-units (metric), as the intended audience is international. Where applicable, the imperial (US) units are given in parenthesis. Dates, where used, are quoted in the international style of dd/mm/yyyy. A version is written in International English, as used by the Canadian host site for an international audience.

8.3 | Currency Conversion Rates

As on 16 NOV 2016 >

1 USD = 0.81 GBP | £
1 USD = 0.94 EUR | €
1 USD = 1.34 CAD | CA$
1 USD = 1.34 AUD | AU$
1 USD = 1.41 NZD | NZ$
1 USD = 14.29 ZAR | R
1 USD = 20.19 MXN | MX$
9 References


City of Toronto. 2017. “Quick Facts - Union Station.” Union Station. Accessed January 8. http://www1.toronto.ca/wps/portal/contentonly?vgnextoid=9bc5962c8c3f0410VgnVCM10000071d60f89RCRD&vgnextchannel=f50e962c8c3f0410VgnVCM10000071d60f89RCRD.


Skidmore, Owings & Merrill LLP. 2016. “Philadelphia 30th Street Station District Plan.” Chicago, IL.

Skidmore, Owings & Merrill LLP. 2016. “Philadelphia 30th Street Station District Plan.” Chicago, IL.


“‘VÍA VERDE’, Wants to Clean out the Air in CDMX - Mexico News Network.” n.d.


